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ENGINEERING

STEEL

The Magazine of Metalworking and Metalproducing

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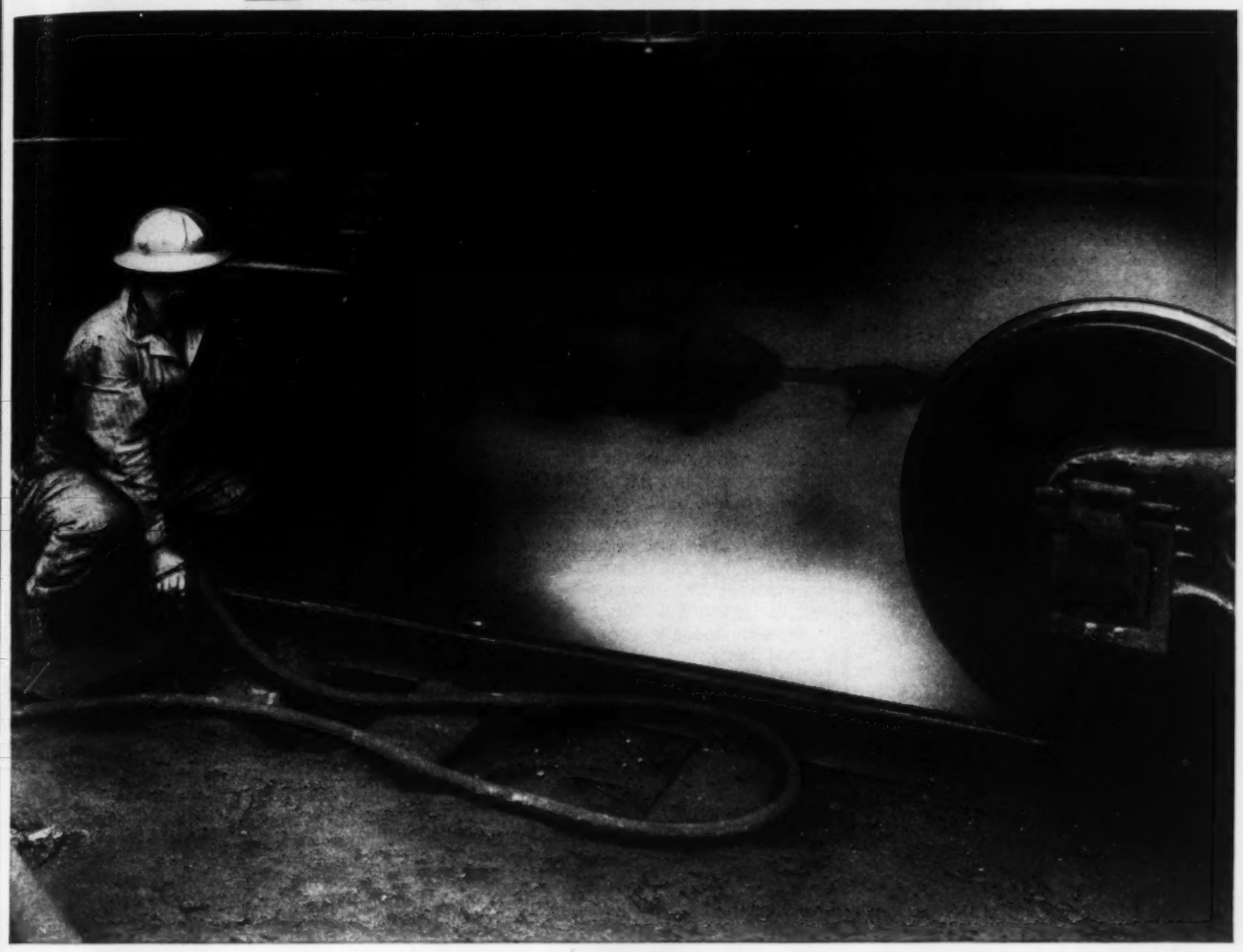

B. F. Goodrich Burstproof steam hose has new cover 100% tougher

Ends hazard of scalding and injury from bursting hose wall

THIS is the safest, strongest hose in steam service. Completely burstproof. Steam or steam pressure cannot burst the hose wall. It's B. F. Goodrich Burstproof steam hose, being used here to send steam through the pipes in a tank car to make the liquid flow out easier, quicker. Here's why the operator in the picture is safe, and why this hose will give longer service:

100% tougher cover—On jobs where ordinary steam-hose covers harden and crack, B. F. Goodrich Burstproof will last longer than any other steam hose you've ever used. BFG engineers have developed a rubber cover 100% more resistant to heat, hardening, cracking. Also resists weathering. Exterior wire-winding can be eliminated—with a 30% reduction in over-all hose weight. Sparkproof, for use around petroleum.

Tube beats the heat—Won't deteriorate from constant high temperatures. Made with B. F. Goodrich Agerite, an anti-oxidant that keeps rubber live and elastic.

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B. F. Goodrich Burstproof hose is recommended for saturated steam pressures up to 200 lb. per sq. in.; superheated steam up to 388°F. The BFG distributor near you has further information and will be glad to help you make a trial installation. Call him. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Burstproof Steam Hose BY

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STAINLESS STEEL
CHROMIUM-NICKEL GRADES

The most popular types of stainless steel are the austinitic or chromium-nickel grades. In stainless, nickel is always supplementary to the chromium. The nickel substantially improves the resistance to corrosion of the stainless steel, and, in sufficient amounts, also imparts several very important physical properties to stainless. Nickel adds greatly to the ductility and tends to make the steel non-magnetic although it becomes slightly magnetic when cold-worked. Chrome-nickel steels cannot be hardened by heat treatment. They work-harden rapidly, and are unusually ductile in all normal conditions, retaining a high degree of ductility even in high temperature applications. The chromium-nickel steels possess excellent welding characteristics. These properties combined with the high corrosion resistance of chromium, render chromium-nickel stainless grades highly useful for a wide variety of applications. They are used with or without additional alloying elements in sheet, strip and plate form.

MORE POPULAR TYPES OF CHROME-NICKEL STAINLESS

TYPE 301 requires the least cold-working or cold reduction of any of the stainless types for a certain strength increase. It combines maximum strength with maximum workability and for that reason is a standard steel for structural purposes.

TYPE 302 is the most widely used of all stainless steels. Known more familiarly as "18-8", it has unusually high ductility which decreases somewhat when cold worked to high tensile strengths. Generally used in the soft annealed condition. Its flexibility in chrome-nickel balance renders it impervious to most common forms of corrosion. It can be drawn, spun and otherwise worked in cold state. Readily welded by all methods. It comes closest to being an all-purpose stainless than any other type.

TYPE 304 has an especially low carbon content although the chrome-nickel balance remains at 18-8. Because of the low carbon content this grade is especially suited for applications where welded construction is required and where the finished equipment must resist the more severe forms of corrosion.

TYPE 305 has an increased nickel content which reduces the work-hardening rate and therefore increases the amount of drawing, spinning and working that can be done between anneals. It has a higher corrosion resistance and better finishing characteristics than grades now in general use. It is becoming increasingly popular for flatware, cooking utensils, watch cases, etc.—where quality is essential.

(This is one of a series of reports on stainless steels that will appear monthly in this column through the courtesy of the **Sharon Steel Corporation.** NEXT: Addition of Third Elements.)

Advertisement

Behind the Scenes...

That Old Feeling

Sometimes we can't understand why we like to get mail, since most of it is bills, but the fact remains: We eagerly await the postman's arrival. Maybe a letter will come from the Commissioner of Internal Revenue refunding $100 to us that we overpaid on our 1949 income taxes. Perhaps the dentist is writing to say he overcharged us for May.

Now that the postal arrivals will be less frequent because the U. S. post office isn't getting enough money, our little thrill of anticipation will be coming three times, not five times, a day. And therein, friends, lies the reason for the furore caused by the postmaster's money-saving action. The intrepid letter reader, like ourselves, doesn't for a minute think that his gross mail receipt will dwindle. But what will fall will be the frequency with which he can feel that thrill when the postman arrives.

What can be done about that anticipatory feeling, besides an increase in taxes to permit a more liberal post office budget?

STEEL has a partial remedy. Perhaps you've already noticed it—an expanded "Letters to the Editors" department—Assistant Editor Hank Holtz in charge—that for the past two weeks and from now on will appear on page 8. There, you can share in the editors' mail—groan with them at an alert reader's discovery of a typographical error, sympathize with another peruser's tax troubles or get new ideas on what to do about depreciation reform.

Second D Day

Speaking of depreciation, we're glad to report that next week appears another study on the depreciation problem. Associate Editor John Morgan, you'll remember, led off May 8 with a special analysis of the general problem. He goes into just one aspect of the matter in STEEL for June 19. He points to one road for reform via factual financial reporting in corporate annual reports.

Reprints? They will be available from Readers' Service Department, Penton Bldg., Cleveland 13, O., for this job as well as for the one May 8.

Expansive

Down in Texas, the boys must think everything's of the vast dimensions of that expansive state. We've just received a note from a Lone Star correspondent addressed to the Pentagon Bldg., not to our modest, nine-story Penton Bldg. The Texan also insists that STEEL is published by Pentagon Publishing Co.

Photo Caption

We are in receipt of a photograph that space unfortunately does not permit us to run, but we are going to carry the caption, verbatim: Today the usuall Spring fair has open his dors. The fair id the sensational show of the hungarian agricultural and mechanical life. Wonderful examples of cows, pigs and sheeps has been presented. On the hourses-show appeared the world famous hourses from Mezohegyes, Babolna, Orkeny. The manufactories for agricultural machines produced new things and the Soviet Union presented the newest developments in the combinated agricultural machines.

Puzzle Corner

Ralph Pappenheimer of Specialty Device Co., E. Buschow of Surface Combustion Corp. and C. Gardner of Orinoco Mining Co. were the first in with correct answers to the boat and kite problem of May 29. The wind velocity was 7½ miles per hour.

We are indebted to A. W. Everest of General Electric Co., Pittsfield, Mass., for another problem about poor old Jake who this time is having a struggle weighing apples. He has 80 apples, all of the same weight except one which is heavier. How does he find that one on a balance scale in four weighings. No weights can be used.

Shrdlu

(Editorial Index—page 53)

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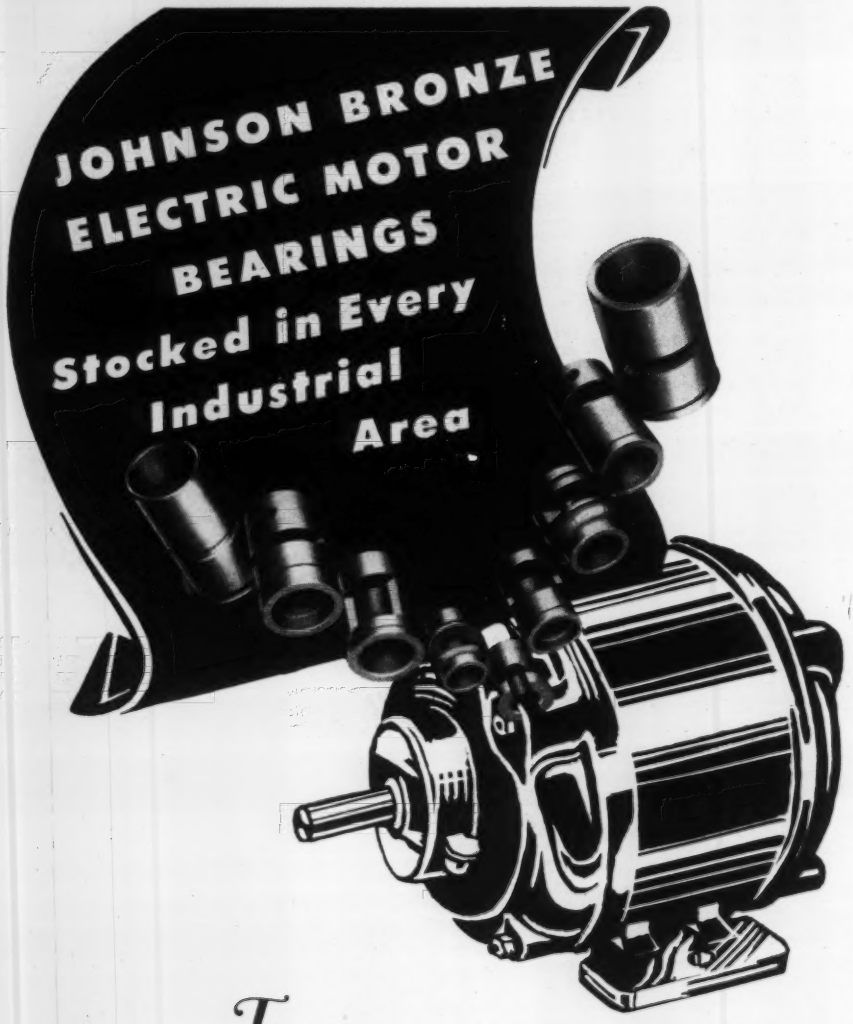

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LETTERS
TO THE EDITORS

Liquid With a Punch

Several years ago we read that there was a new development in deep drawing which utilized a liquid punch rather than the conventional punch and die set. I believe that this development was described in your magazine. Can you inform us as to any progress that might have been made and please let us know who is doing this work and whether any special equipment is available for doing deep drawing with liquid punches.

J. Punzak, General Manager
United Metal Goods Mfg. Co., Brooklyn, N. Y.

• *The liquid punch development was covered in STEEL, April 4, 1947, page 90. Further information on the process and equipment used may be obtained from developer, S. B. Whistler & Sons Inc., 748 Military Rd., Buffalo 7, N. Y.*

Like Wine We—

I have been a faithful reader of your magazine for many years and must say you improve with age. I find the information you provide valuable to me, not only as a steel fabricator but also as an investor of diligently saved dollars.

Your issue of April 24 contains an exhaustive financial analysis of the steel industry for 1949 which puts all the

stock brokers' reports to shame. I was distressed, however, by the absence of Acme Steel Co. from the report. I would be obliged if you could mail me the same for this company.

Ronald Gruen, Flushing, N. Y.

• *The analysis is confined to companies with steel ingot capacity. Acme Steel has finishing capacity only. Its figures can not be fairly compared with those of ingot producers. We are sending financial data for this company for 1948 and 1949.*

Source Found

A few days ago we received an inquiry from one of our customers for information on Koenig metal. The information which we possess on metals does not give us the answer, and we are therefore inquiring of you for help as to the possible source of this metal.

Paul G. Gille
Paul Mueller Co., Springfield, Mo.

• *Koenig metal we cannot find, but we think you have reference to Konik metal, which has almost the same phonetics. This material is made by Continental Steel Corp., Kokomo, Ind., and is an open hearth steel containing chromium, nickel, copper, etc., for greater strength and resistance to that old enemy, rust. Use is for sheets, roofing, wire, fencing.*

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STEEL

The Magazine of Metalworking and Metalproducing

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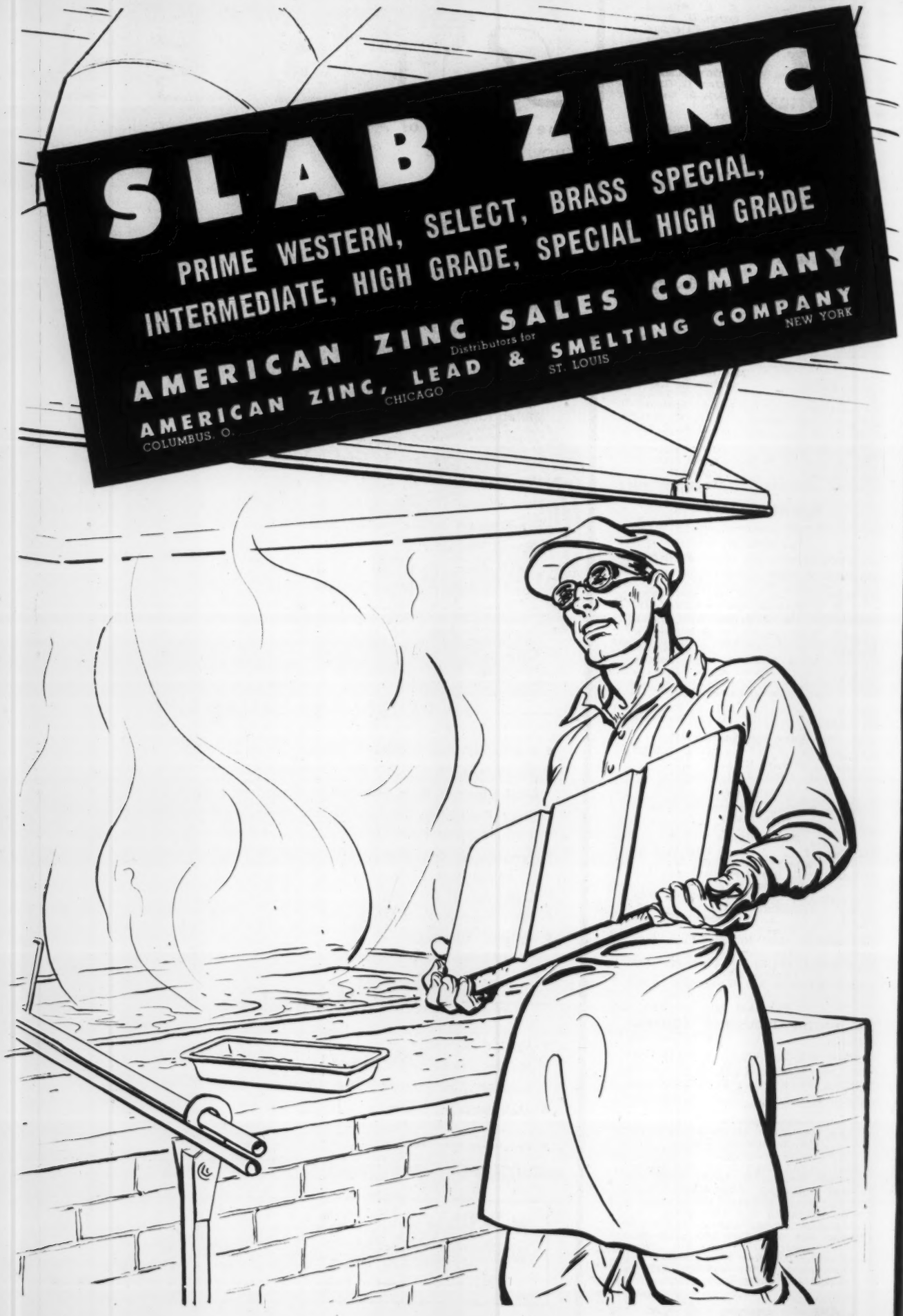
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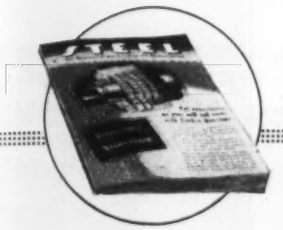

June 12, 1950

Successful Formula

Decision of a number of prominent leaders in business and industry to fight back vigorously against unfair attacks by the federal government administration is beginning to pay off handsomely. Ever since A & P began to take its case against government lawyers to the public and top executives in the chemical, oil, steel and other industries began to speak out boldly against the smear tactics of certain congressional investigating committees, the tone of public opinion toward business and industry has improved noticeably.

This change was described realistically a few days ago by Raymond Moley in his syndicated column in daily newspapers. He referred approvingly to recent addresses by Benjamin Fairless and Charles White and then contrasted the effectiveness of their technique with the futility of that of most business and industry executives in the Liberty League days 15 years ago. Mr. Moley's appraisal of the success of the new fighting spirit of industry is being seconded with increasing frequency in editorial and column comments in newspapers throughout the country.

Now that after 17 long years American industry has found a formula that clicks, no time should be lost in applying it to every situation in which industry can rewin or gain public confidence and esteem. There are dozens of problems in our domestic economy in which demagogues in Washington have been successful in convincing the public that industry or "big business" is guilty of shortsightedness, selfishness or illegal action. Now is the time to take the offensive on the more important of these false charges.

One good place to start would be to show the man in the street that industry is not to blame for high prices to the extent the demagogues claim. This can be done effectively by illustrating simply and dramatically how much exorbitant taxes increase the price of everything the people buy. When intelligent citizens realize the extent to which they are being victimized by hidden taxes on such things as a loaf of bread, package of cigarettes, automobile, phone call or home they will realize that Washington, not business, is the real culprit responsible for high prices.

Already industry is doing some good work along this line. It should be expanded to the limit in volume and tempo.

* * *

FAR TOO MANY SIZES: Many years ago it became obvious to officials of General Motors Corp. that better overall manufacturing efficiency could be realized if the technical and engineering knowledge of all units in the corporation's 36 operating divisions could be co-ordinated. To effect this co-ordination—particularly in regard to materials, processes, equipment and general shop practice common to all—a production engineering section was organized.

Activity of PES has been greatly accelerated since the end of the war, due in part to the increased pressure for effecting manufacturing economies. Although progress in cost cutting has been substantial in many lines of PES activity, experience has proved that perhaps the greatest opportunity for reducing costs lies in the field of standardization.

Standardization had been carried on for many decades by many companies and associations, but in the opinion of GM engineers the conditions of the postwar period called for more rapid action. Therefore PES intensified its efforts to-

(OVER)

ward standardization, using the time-proved technique of standards development by joint industry conference.

As an example of what can be done, it was found that 750 sizes of double crank single-action presses available to the automotive industry could be reduced to 76. The advantages in lower inventory, greater interchangeability, lower cost and simplification of service and maintenance are obvious.

That GM rates standardization as its No. 1 weapon against high manufacturing costs is significant because opportunities for standardization in the metalworking industries are unlimited. —p. 90

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ASK FOR HIGHER RATES: Outcome of the rivalry between highway truckers and eastern railroads will affect many metalworking companies. The latest move is appeal by the truckers to Interstate Commerce Commission for permission to substitute for the old rates based on a minimum shipment of 20,000 pounds a new schedule embracing a new minimum shipment of 32,000 pounds on which present rates will continue and a second minimum of 20,000 pounds on which rates ranging 10 to 20 per cent over present rates will be charged. If approved by ICC the new schedule will go into effect June 21.

Action of the truck carriers is a bid to serve companies that do not have track facilities and whose shipments are less than the 80,000-pound minimum involved in the recent reduction in railroad rates. If ICC grants approval, cost of transporting some metal products will be increased moderately. —p. 61

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TAX ALSO PART OF PRICE: One of the tragedies of the new deal and fair deal eras is the extent to which the federal government has stolen taxing privileges once possessed by state and local governments. This has forced the latter to go to extremes to obtain revenues for local governmental needs.

How this affects industry adversely is illustrated by the protest of Carnegie-Illinois Steel Corp. against proposed higher taxes on its plants in Allegheny county, Pa. If the suggested rates were put into effect, Carnegie-Illinois would have to pay on an assessed valuation of $13.85 per ton of steel capacity in Pittsburgh, as against comparable valuations resulting from actual sales of properties of $4.05 per ton at Farrell, Pa., and $5.25 at Portsmouth, O. C-I President Clifford Hood is right when he says that "taxes are part of the competitive price of steel." —p. 66

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ELIMINATE HAND WORK?: Naval Ordnance Laboratory at White Oaks, Md., is confronted with a problem in connection with the machining of half-sections of nozzles which control the flow of air through large wind tunnels. Preliminary machining is performed on a horizontal milling machine, which produces a profile-cut within 15 millionth of an inch of the contour desired. The surface is scraped and polished by hand to a prescribed accuracy of plus or minus 6 to 8 microinches.

To date six pairs of small half sections have been finished and the average time required for hand scraping and polishing one pair has been four weeks for two men. It is estimated that it will take two men 10 weeks to hand finish a pair of 16 x 72-inch nozzle halves now in process. Much larger nozzles are in the drafting stage.

The $64 question is: Can the job be done by machine, with or without a template, so that the time consuming hand finishing can be eliminated? —p. 72

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For years the association has been negotiating with UAW-CIO on wages and working conditions on behalf of its member companies. Recently the association and UAW-CIO entered into a five-year agreement on a common trust fund providing $100 a month pensions at age 65, including social security. Trustee for the fund was named last week. An unusual feature of the plan is that any employee covered by it can move from one member company of the association to another without losing his pension equity. It will be interesting to note how this factor affects labor relations in the non-member companies. —p. 75

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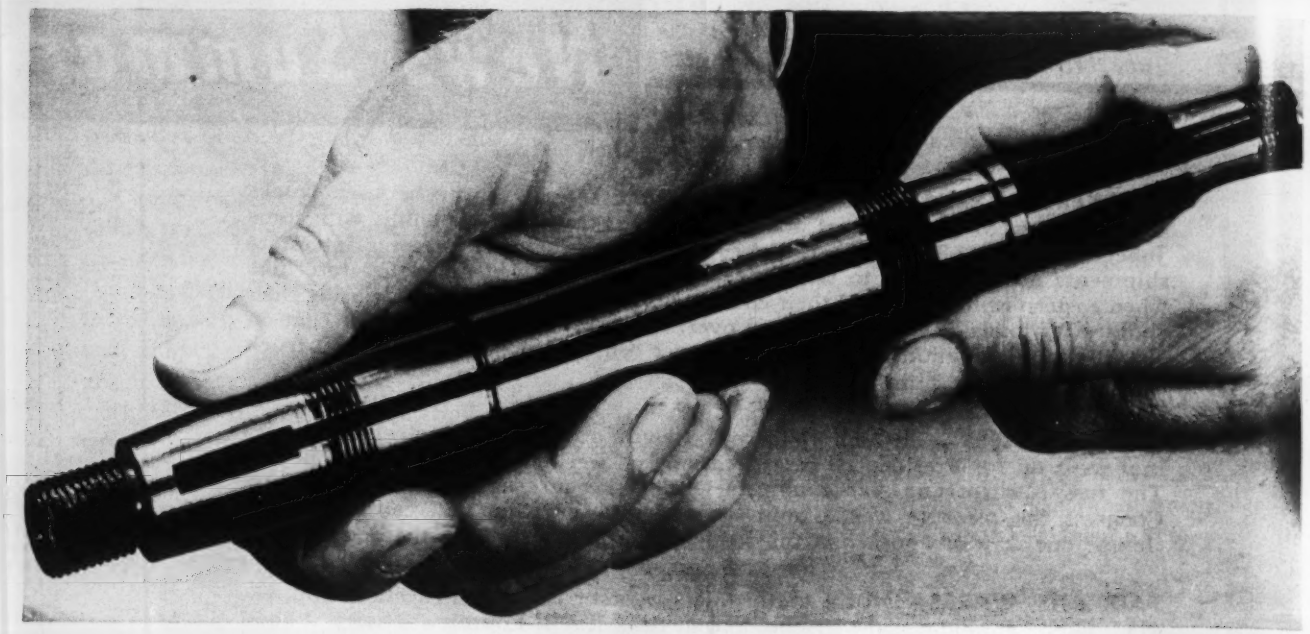

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STEEL
A PENTON PUBLICATION

Steel Truckers Overhaul Rates

As a result you will pay more for steel haulage IF: Revisions become effective June 21; you buy from out of the state; and you don't take big enough shipments

NOTE TO STEEL BUYERS:

It may cost you more for truck haulage of steel from mill to your plant after June 21.

On that date, unless there's an unexpected hitch in plans, about 400 motor carriers will revise their rate structures on interstate shipments of steel. In some instances the revisions will result in increased haulage charges.

Under proposed tariffs filed with the Interstate Commerce Commission the steel truckers will have two minimums for truckload shipments rather than just the 20,000-pound minimum they now have. The 20,000-pound minimum would be retained, but a 32,000-pound minimum would be added to truckers' freight schedules.

On 20,000-pound loads the rates would rise 10 to 20 per cent. Truckloads with at least 32,000 pounds would take the rates now existing for 20,000-pound minimums.

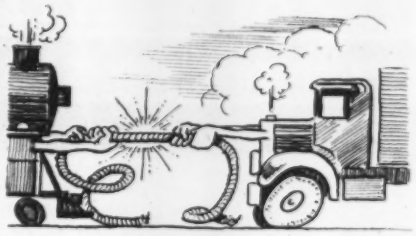
Examples of the steel trucking rate changes are shown in the accompanying table.

Most Escape—It is estimated only 10 per cent of the volume of steel moving by truck will be hit by the higher rates, for around 90 per cent is moving in sufficiently heavy quantities to qualify for the 32,000-pound minimum and the same rate that now exists. Most of the carriers making the changes are in what is known as Central territory, where the bulk of steel production and consumption is located.

The new rates will take effect June 21 unless protests are filed with the ICC. None had been registered by the middle of last week and none were expected.

Second Choice—This rate change is not all the steel truckers would like.

It is what they have resorted to because of the recent reductions in railroads' carload rates on the lighter steel products shipped in minimums of 80,000 pounds. When the railroads were given permission to reduce their rates May 1 the truckers were planning to increase rates on 20,000 minimum truckloads by 10 to 20 per cent on that date and had filed



Rate Shifts: A Tug o' War

tariffs to that effect. The railroad rate reductions prompted the truckers to delay application of increases. Reconsideration tempered the scope of the truckers' increases, with a result that the increases in cents per hundred pounds will be the same as originally proposed but will be applicable on a smaller volume of steel shipments.

Revisions in rates are tailored so that the larger shipments on which trucks and railroads are more competitive are not affected by the rate increases.

Only interstate shipments of steel will be affected by the truck rate changes scheduled for June 21. Intrastate rates are separate matters.

Although the new railroad freight rates on steel are in some instances lower than truck rates it may be cheaper for a steel consumer who does not have a railroad spur to take shipment by truck, for the rail charges plus trucking from a city terminal may total more than truck charges from mill directly to consumer's plant. Truck shipments also are exempt from shrouding and dunnage charges made by railroads.

Steel Trucking Rates
. . . the new and the old

Mileage Blocks	To	From	TRUCKLOAD MINIMUMS 20,000 lbs (in cents per 100 lbs) NEW	20,000 lbs OLD	32,000 lbs NEW
1 to 5	Weirton, W. Va.	Steubenville, O.	5½	4½	4½
21 to 25	New Castle, Pa.	Youngstown	10½	8½	8½
46 to 50	East Palestine, O.	Pittsburgh	16	13	13
71 to 75	Navarre, O.	Weirton, W.Va.	22	18	18
96 to 100	Mercer, Pa.	Canton, O.	29	24	24
121 to 130	Ashtabula, O.	Pittsburgh	31	26	26
141 to 150	Mansfield, O.	Detroit	33	28	28
191 to 200	Lima, O.	Chicago	38	31	31
241 to 250	Flint, Mich.	Chicago	40	35	35
291 to 300	Detroit	Weirton, W.Va.	46	40	40
361 to 380	Indianapolis	Wheeling	52	45	45
451 to 475	Chicago	Pittsburgh	57	51	51

Pricing Bill Creates Stir

Controversy over measure continues right up to President's office

SENATE PASSAGE of a delivered pricing bill was like poking a hornet's nest. Suddenly the air was abuzz.

Congressional opponents and labor interests began pressuring for a presidential veto, while congressional proponents were equally as insistent on a presidential approval.

The bill, passed June 2 by the Senate by a vote of 43 to 27 and sent to the President, would amend antitrust statutes to legalize delivered prices and freight absorption, provided a seller acts independently and does not collude or conspire with others.

Free Fight—It was one of the most controversial measures affecting business to come before the Senate this session. Party lines were disregarded in the lively floor debate which preceded passage of the bill and in the actual voting on the measure. The measure was pushed through the Senate with the support of 30 Republicans and 13 Democrats. Opposing it were 25 Democrats and two Republicans. The bill, a compromise worked out by House and Senate conferees, passed the House on Mar. 14.

Prove Your Innocence—As passed by the Senate the bill specified that

on charges of discrimination in price, or services or facilities furnished, the burden of showing justification is upon the person charged with the violation. Unless justification can be shown, the Federal Trade Commission is authorized to issue an order terminating the discrimination.

The bill further stipulates that a seller may justify a discrimination by showing that his lower price or the furnishing of services or facilities was made in good faith to meet competition. It would be permissible for a seller to maintain a price differential that he customarily maintains above or below his competitor's price.

Who Pays the Freight?—The measure has sometimes erroneously been referred to as a "basing point" bill. It has nothing to do with basing points. It encompasses only delivered prices and freight absorption. Demands for such a measure developed in Congress as a result of Federal Trade Commission policies and Supreme Court decisions which were widely interpreted as outlawing all forms of freight absorption and delivered price systems.

The bulk of the steel industry discontinued absorption of freight and started quoting mill prices. A few companies, however, continued absorption and in some cases companies which had abandoned absorption resumed it in a limited way on some products.

Future Impact—While the bill was working its way through Congress it was the consensus that even if it finally became law there would be no immediate mass return to freight absorption. Demand for steel is so great that no such inducement is necessary to sell a mill's output. It was believed that a return would be brought about only by a business recession.

Big Deal

A growing federal agency—the Bureau of Public Debt—will move into the world's largest industrial plant to carry on its activities.

The Treasury Department's agency will move into the former Tucker and Dodge Chicago plant Jan. 1. It will vacate offices now held in the Merchandise Mart, Chicago. Built during the war for about $175 million, the plant was first used to build airplane engines for B 29s. Later it was acquired by the now-bankrupt Tucker Corp. to manufacture the phantom automobile. The government last December took back the plant.

Wide World

MITE AND MIGHT: Battleships, vacuum cleaners, roller skates, trains—all depend on antifriction bearings. The bearings can be incredibly tiny as the roller bearing in the photo on the left or as weighty and bulky as the spherical roller as in the photo on the left. Some are so small that it takes 7000 of them to equal one ounce. At the other end are 5100-pound spherical bearings, 4 feet in diameter, that enable machinery to do herculean tasks in steel, aluminum and paper mills. Before World War I, the U.S. imported most of its ball bearings. Today 35 major plants in this country turn out billions of the tremendous trifles like those used in ball point pens. These scenes were taken at the SKF Industries Inc. shops in Philadelphia

Tax Bite Cuts Deeper

TOTAL tax bill for 48 large iron and steel companies in 1949 amounted to nearly $490 million. The total, which includes federal, state and local government assessments but does not include social security and unemployment tax, was about 172 per cent higher than in 1940.

The amount paid in taxes was equivalent to about 6.6 cents of each dollar of revenue in 1949, says the American Iron & Steel Institute. It was equal to about $645 for each employee, as compared with about $250 for each employee in 1940. It was equivalent to over 19 cents for each dollar paid in wages and salaries.

The companies' total 1949 tax bill exceeded their combined payments of dividends to shareholders by $267.5 million, whereas in 1940 this difference amounted to only $42 million.

Federal income taxes amounted to about $377 million last year, equal to nearly $500 for each employee.

This sum was equivalent to the combined expenses in the 1949 fiscal year of the legislative branch, all federal courts, the Department of Justice, the Department of Labor, the General Accounting Office and the Maritime Commission.

Pension Conferences in Cleveland

Cleveland will be the scene June 28 of the second of five pension conferences sponsored by the National Association of Life Underwriters. This conference, like the one held last April in Chicago, is designed for the benefit of employers, attorneys, labor leaders, accountants and trust officers.

The Cleveland affair will be held at the Hotel Hollenden.

U. S. Steel May Roll in East Within 18 Months

U. S. STEEL may be producing cold-rolled sheet and tin plate at its new Morrisville, Pa., mill within 18 months. Corporation's finance committee is scheduled to approve appropriations late this month; equipment orders will be placed quickly.

Finishing capacity will be built first. Primary steel capacity construction will be geared to development of the Venezuelan ore deposits.

Hot-rolled coils will be shipped from Pittsburgh and Youngstown to feed Morrisville finishing mills until primary capacity is built.

Some consideration is being given to diverting the 54-inch mill on order for Columbia Steel to the Morrisville plant. An electrolytic tin plate line will be part of the new mill.

In addition to steel products now made by Carnegie-Illinois, the new plant will make standard pipe and wire products. These are now produced by U. S. Steel's National Tube Co. and American Steel & Wire Co.

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Bethlehem Climaxes Steel Expansion Spurt

Its $32 million program for Johnstown, Pa., is one of a flurry of modernization projects recently announced, completed or started by several steel producers

BETHLEHEM Steel Co.'s $32 million program to remodel its Johnstown, Pa., mills climaxes a spurt in new construction and expansion over the past six weeks by steel producers.

That work and other programs under way or projected will continue the industry's postwar expansion pace. About 3 million tons were added to ingot capacity in 1947, 2 million in 1948 and 2 million in 1949.

On the Bandwagon—Besides Bethlehem, other steelmakers have announced, just completed or started these projects in the past month and a half:

Granite City Steel Co. will spend $2.6 million to nearly double its production of cold-rolled products.

Inland Steel Co. will soon be getting coke from a new 65-oven battery at Indiana Harbor, Ind.

Republic Steel Corp. is boosting its ingot capacity in Cleveland by 11 per cent and, starting in 1951, will be producing 137,000 tons more of cold-rolled sheet annually.

Carnegie-Illinois Steel Corp. is spending $9 million to build 174 coke ovens at its Clairton, Pa., plant. It will also boost the capacity of its Gary, Ind., sheet and tin mill by 120,000 tons annually to 732,000 tons.

Another U. S. Steel Corp. subsidiary, Tennessee Coal, Iron & Railroad Co., has purchased a site for an iron ore terminal at Mobile, Ala., to handle imports of foreign ore.

Jones & Laughlin Steel Corp. has broken ground for a new open-hearth shop in Pittsburgh that will have a capacity to produce 1 million tons of ingots yearly.

Going Up—Bethlehem's Johnstown plans involve an increase of nearly 15 per cent in steel ingot producing capacity, a boost in coke and pig iron capacity and new rolling mill and auxiliary equipment.

"Unless major and costly changes are made," says President Arthur B. Homer, "the Johnstown plant is bound to become a marginal producer, working only when business is at its peak. It is marginal now in certain respects and will become more so without essential improvements."

Hodge-Podge—Bethlehem's present set-up at Johnstown is a string of small plants built at different times. It's necessary to shunt all kinds of materials back and forth between them. Bethlehem will consolidate pig iron, ingot and semifinished steel production at one plant. At the same spot it will make all the coke needed for these operations. Steel ingot capacity will be increased from the present annual rate of 1.9 million tons to 2,160,000 tons. Pig iron capacity is being increased by 216,000 tons annually.

One of three batteries of coke ovens has been rebuilt recently and another should be ready about the end of the year. At that time a third unit will be taken out for rebuilding, which should take another year. When completed, coke production will be about 112,000 tons a month against present output of about 76,000 tons a month.

It Takes Time—"We expect to have all the new mills in operation in 15 to 18 months," says Mr. Homer. The general program also includes a new 20,000 kw turbogenerator to supply extra electric power.

Bethlehem has two other major expansion programs in progress at Lackawanna, N. Y., and Sparrows Point, Md. Included in both these projects will be added sheet and strip capacity.

Granite City Steel To Expand

An expansion program that will nearly double its output of cold-rolled products will be launched this month by Granite City Steel Co., Granite City, Ill.

New equipment costing $2.6 million will be added, including a second coiler, more annealing, shearing and scale-breaking facilities, more run-out tables and a faster pickling line. The equipment will boost cold-rolled sheet production from the present 25,000 tons monthly to 40,000. Ingot capacity formerly devoted to a two-year pipeline plate order will supply the expanded rolling operation. The company will make no more plates or hot-rolled sheets for the market.

The project will be completed next March. At least one more expansion program for 1951 is in the planning stage.

Granite City last fall finished a $22 million, 15-year modernization program. Last April it began operating additional new equipment which hiked tin plate production 50 per cent. An open house June 14 and 15 will show those improvements.

Republic Installs New Blower

Republic Steel Corp. is installing a new turboblower at its Cleveland District plant.

Designed to deliver 125,000 cubic feet per minute with a pressure of 40 pounds per square inch, the blower will enable the plant to ultimately convert its No. 1 blast furnace to pressure blowing. Pressure blowing increases production of iron and cuts down coke consumption.

Five of the company's 21 blast furnaces have already been converted to pressure blowing. The application of the technique to these five furnaces results in an increase in iron production almost the equivalent of an additional furnace.

Completion of the new turboblow-

SHORT STORY: Near the site of construction of a new open-hearth plant that will be completed late this year at a cost of about $12 million, this sign board tells a story about the East Works of Armco in Middletown, O.

er in Cleveland will permit the eventual retirement of seven vertical steam blowing engines.

Inland Builds Coke Battery

Inland Steel Co. will begin production in a new $6 million coke oven battery at Indiana Harbor, Ind., in late July or early August.

The 65-oven battery, to be known as No. 6, will soon replace No. 1 battery which was built in 1914. The 65 ovens will convert 1400 tons of coal per day into about 950 tons of coke.

Inland has a total of 484 coke ovens, including the old No. 1 battery which is being taken out of operation for future rebuilding. The new unit was constructed by Koppers Co. and is of the Koppers-Becker type.

Carnegie Fights Tax Hike

Carnegie-Illinois Steel Corp. warns that it won't expand in the Pittsburgh area if excessive taxes create competitive disadvantage.

Clifford F. Hood, president of the U. S. Steel Corp. subsidiary, objects to a $46 million or 39.8 per cent increase in valuation of mill machinery at six of the company's plants in Allegheny county, Pa. The increased machinery valuation will boost the tax load $1.8 million to $6 million and is not based on any material change in plants or an increase in capacity.

Mr. Hood says taxes are part of the competitive price of steel. The tax rate per ton of steel made at the Duquesne Works in the Pittsburgh area is already higher than in Youngstown. He points out that when Carnegie sold its Farrell, Pa., plant to Sharon Steel Corp. the sale price was made at $4.05 per ton of capacity. Allegheny county is proposing an assessment value of $13.85 per ton in Pittsburgh. Wheeling Steel Co. sold its Portsmouth, O., mill at $5.25 per ton.

Pittsburgh Steel Sets Record

All production and shipment records were broken in May by Pittsburgh Steel Co., Pittsburgh, at its Monessen and Allenport works. New records were established at Monessen in the coke plant, the open hearth and the No. 2 rod mill. The Allenport mills established an alltime hot mill production mark.

As the result of these records the company was able to increase substantially its shipments to customers in May.

NEA

INDUSTRIAL SILOS: Ideal storage space for dry clays that go into porcelain insulators manufactured at Derry, Pa., by Westinghouse Electric Corp. are these huge silos. Each is 14 feet in diameter and 68 feet high. They will hold six carloads, or 300 tons of the powdery material. A 7-ton vacuum tank, concealed by the corrugated siding on top of the silos, draws the material up through 6-inch pipes at a 6-ton-per-hour rate

Steel Output Up in 13 States

Steel ingot capacity in 13 states is higher now than in 1949.

These increases, the American Iron & Steel Institute points out, helped swell the nation's ingot capacity to a record high level, nearly 100 million tons a year.

Increase in ten states accounted for most of the gain of 3,271,870 tons in national steel capacity during 1949. The ten states and their capacity increases in tons that year are: Pennsylvania, 743,830; Ohio, 634,000; Michigan, 574,990; California, 329,750; New York, 278,000; Minnesota, 228,000; Texas, 192,000; Maryland, 141,000; Utah, 116,600; and West Virginia, 110,000.

Small gains were made in Washington, Indiana, and Kentucky.

Michigan is now the seventh largest state in steel capacity. In 1948 it was in eighth place. California has risen from tenth to ninth place.

Pennsylvania is in first place, followed in order by Ohio, Indiana, Illinois, Maryland and New York. Eighth largest state is Alabama, and tenth is West Virginia.

Chicago Plant Expansion Soars

Investment programs totaling $12,092,000 for additional industrial facilities in the Chicago area were announced in May by 29 companies, says the Chicago Association of Commerce & Industry. In May last year the commitments for industrial development were $7,567,000.

For the first five months of 1950 this type of investment in the Chicago area amounts to $119,151,000, nearly three times the amount for the comparable period last year—$41,962,000. These plans for plant outlay involve new factories, additions to existing plants and the acquirement of industrial land and buildings.

Valentine Fire Brick Sold

A. P. Green Fire Brick Co., Mexico, Mo., bought the Valentine Fire Brick Co., Woodbridge, N. J.

The purchase makes a more complete line of products available to Green's customers: Valentine produces a type of firebrick not manufactured in Missouri. Valentine operates two tunnel kilns in conjunction with completely modern production facilities and produces a semisilica firebrick. Valentine's line of semisilica refractories will complement the present line of fireclay and high alumina refractories manufactured by Green.

Trumbull Sells Raymersion

Trumbull Electric Mfg. Co., Plainville, Conn., sold its Raymersion Oven business to Jensen Specialties Inc., Detroit. Raymersion was the tradename given to Trumbull's infrared oven heating process.

The Jensen organization agreed, under the terms of sale, to service all existing facilities previously manufactured and sold by Trumbull. Paul H. Goodell, previously associated with Trumbull as manager of Raymersion sales, is now employed by Jensen.

Shipyard Gets a Face Lifting

The wartime Walsh-Kaiser Shipyard in Providence, R. I., is getting an industrial face-lifting.

Melvin T. Berry bought the 159 acres and 55 buildings from War Assets Administration for $410,000, renamed it Harborside Park and will develop it into a "zoned" business and manufacturing community. Offices and lightest industries will be located nearest the bordering residential district and heaviest industries at the end nearest the water. If none of the existing buildings suit, Mr. Berry will build something to conform with a new industry's requirements.

A few companies are already at Harborside: Three trucking firms, a maker of prefabricated garages, an industrial boiler firm, a metal fence manufacturer and a heating and piping firm.

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U.K. Says "Yes" and "No" to Union Plans

Britain's refusal to join the coal-steel plan obscures an agreement to be a member of another co-operative plan, the European Payments Union

BRITAIN's "no" to the Schuman plan for economic union of European coal and steel industries has drowned out the "yes" to another co-operative scheme that could bring as dramatic benefits to Europe as the coal-steel proposal.

Britain joined 17 continental members of the Organization for European Economic Cooperation to form the co-operative European Payments Union that will restore a semblance of free transfer of money in Western Europe after years of bilateralism. The scheme has the backing of the United States. Progress in ironing out details of the union was spurred when Britain signed up late in May, and EPU may be a reality by June 30.

Dollar Dikes—EPU means the creation of a credit pool, backed by dollars, in which the currencies of 18 member nations will become interchangeable without restrictions. ECA will make good credits extended by countries with a trade surplus to others.

All members will deal through the EPU pool and will have either credits or debits on their books. The currencies of member countries will not be convertible into dollars, but there will be an indirect link through gold.

Gold Links—Washington and the ECA are insisting that gold get an essential role in final settlements of accounts, so that if and when the EPU is a success a general convertibility of currencies of all Western World countries will be a fairly easy problem.

Advocates of the program say it will: Make obsolete import and export restrictions in the areas affected; stimulate trade among the 18 participants; boost employment and the standard of living; make Western Europe more self-sufficient; be a forerunner of general convertibility of currencies and free world trade among all Western nations.

Turbulent Waters—Although Britain has taken the plunge into the credit pool, she still is avoiding the tricky currents of the steel-coal plan. France, Western Germany, Belgium, Italy, Luxemburg and the Netherlands will go ahead without her "to pursue a common action of peace, European solidarity and economic and social progress." Britain may come in when she's assured the water's fine.

J. Bull Looks Before He Leaps

Britain's caution almost ruined the credit pool. John Bull was the last to join and did so only with the provision that sterling be recognized as a world currency and with assurances that no undue strain on gold or sterling would develop.

Prime Minister Clement Atlee and his government finally did join when they calculated that their country may have to pay out less gold to Europe under the EPU than under the old bilateral agreements.

The official Atlee explanation for not joining the steel-coal pool is that there were no preliminary talks "to discuss the most effective and expeditious method" of organizing it.

One reason for British hesitancy is that the island steel industry is not linked geographically to the continental industry that arcs from the Ruhr river in Germany to the Meuse in France. British industry is doing as well as any in Europe. Would political, not geographic, links to continental producers hobble the British?

Steel allocations that have existed in the United Kingdom since 1939 were abolished for all products except sheets and tin plate. The catch is, though, that restrictions remain on the activity of many steel users—automakers, shipbuilders, construction firms.

The shortage of sheet steel should end by 1952 when the new works at Margam, South Wales, is finished. That works will begin to produce steel slabs next October. The slabs will at first be sent away for reduction to sheets and plates, but early in 1951 the first steel strip and plates will be produced in the continuous strip mill of the plant. Full production of 25,000 to 29,000 tons a week of strip and plates will be reached in 1952.

French Coal Men Demur

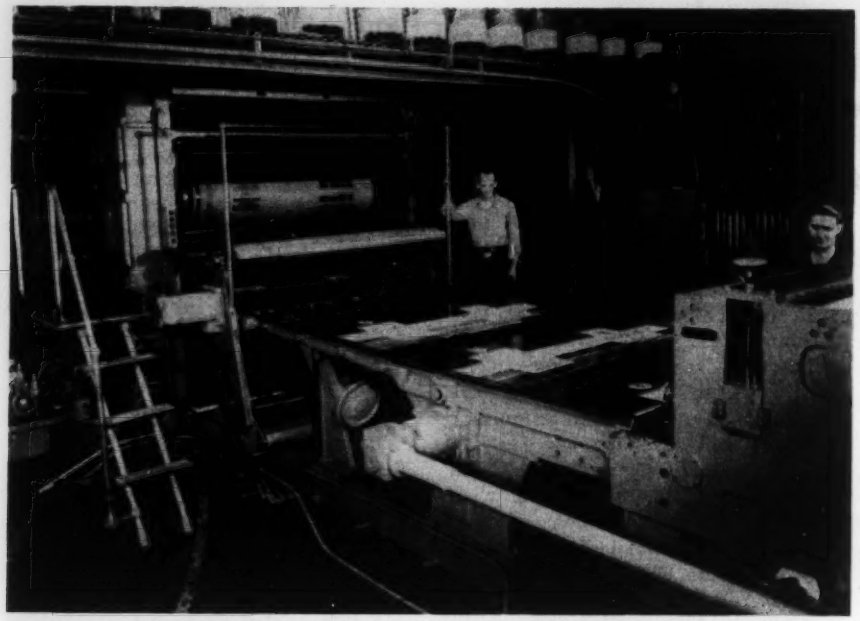
Strongest objections in France to the steel-coal plan are coming from the coal industry.

Managers of the French coal industry fear they'll be at a disadvantage in a pool because: Their coal costs more than the German fuel; output per man is low because French mines are hard to work; French coal is not suitable for metallurgical coke. The executives have been very vocal in their objections—which is awkward because they are managing an industry owned by the French government that first proposed and is strongly supporting the scheme for economic union.

Prime Minister Georges Bidault is having trouble with another nationalized industry, too. The operating deficit for French railroads is growing and for 1950 may exceed over 50 billion francs despite a subsidy of 50 billion francs alloted in the 1950 budget. As if that weren't enough

Authenticated

QUIET EFFICIENCY IN COVENTRY: This single-story factory in Coventry, England, produces Jaguars, British luxury cars. Partly responsible for the increased efficiency and higher output of the plant are machines like the Landis grinders (left center foreground). Moving conveyors are used throughout the factory. In this photo you can see the con rod and flywheel lines on the right, the crankshaft lines on the left. The conveyor on the far left feeds the body-mounting track on which cars are just discernible.



MILLION-DOLLAR PROCESS: One of the world's largest metal lithography presses, an integral part of a new Rheem Mfg. Co. development, handles large sheets of heavy gage steel just as though it were paper. The printing process opens new possibilities in packaging and merchandising oils, chemicals and other products. A large 55-gallon steel drum now can be lithographed in two or more colors

of a problem, railroad unions threaten to strike for more money.

Germans Will Horse-Trade

The Germans are prepared to do some tough horse-trading in the coming meetings to discuss the Schuman plan.

They have three objectives: An increase in the steel production ceiling to 14 or 15 million tons annually; a boost in the steel export quota from the present 990,000 tons annually to whatever quota the French get; an end of all dismantlings.

Ruhr steel output is in the doldrums, and the May production fell below the April level. Both domestic and foreign orders are off, although export contracts for specialty steels are holding up well. Great Britain is showing some interest in German semifinished items. The British also just concluded a new steel scrap buying contract on 330,000 tons to be shipped until fall. The agreement was protested by German steel men. More than 4.4 million tons of scrap were exported from Germany since the war.

The new law No. 75 (renamed No. 27) has been announced to reorganize Ruhr heavy industry and is about the same as the old one except that high commissioners in charge of Ruhr industries will include representatives from Britain, the U. S. and France. Formerly, France was not included. The coal and steel industries must be reorganized on a vertical, integrated basis. No definite deadlines have been set when the reorganization must be finished. Reorganization may now wait until details of the Schuman plan are more definite.

Schuman Plan: Belgian Boon?

Belgian coal and steel producers think the Schuman plan will help solve their economic problems.

Their dilemma is this: How to keep their vital export markets in the face of increasing competition. They think allocated production and markets is their only answer for the short term. They hope that in the long run the steel-coal pool will open up a free trade area for most of Western Europe which will help them as much as any producers in Europe because their domestic markets are relatively small.

Belgian steel production is running about 30 per cent under the 1949 level, but it's still 16 per cent above the 1936-1938 average. Activity among steel users—particularly machine tool builders, railroad equipment makers, shipbuilders and electrical equipment manufacturers—is sluggish.

Donora Smog Suit Dropped

One damage suit against American Steel & Wire Co. as a result of the Donora, Pa., smog incident in November, 1948, has been withdrawn.

"We have been notified of the voluntary withdrawal of the $25,000 damage suit filed by Ciriaco Ritacco," says O. P. Moon, secretary and general attorney for the U. S. Steel subsidiary. "No settlement was involved because Mr. Ritacco reconsidered his action and personally requested his attorney to drop proceedings."

Alcoa Stays Together

Court rules its physical assets need not be disturbed. U. S. sought to break it up

THE GOVERNMENT has lost another round in its 13-year court fight to break up Aluminum Co. of America.

Judge John C. Knox of the U. S. District Court of New York rules that "for the present at least the organization of Alcoa's physical properties should not be disturbed." But he does order a divorce between Alcoa and Aluminum Ltd., a Canadian firm, and directs stockholders in both to get rid of their holdings in one or the other. The judge also puts a stop to a system whereby Reynolds Metals Co. and Kaiser Aluminum & Chemical Corp. share their industrial improvements with Alcoa.

The Court Says "Okay"—Alcoa received court permission to buy the government's war-built aluminum plant at Massena, N. Y., for about $5 million. The company plans to produce 118 million pounds of aluminum a year at the facility.

Judge Knox says Alcoa accounted for 60.6 per cent of the nation's aluminum output in 1947. The figure dropped to 54.5 in 1949.

Graphite Changes Division Name

Cleveland Graphite Bronze Co. announces that the name of its Monmouth Products Division was changed to the Replacement Sales Division of Cleveland Graphite Bronze Co.

The sales division thus becomes a part of the Cleveland organization's general sales division; it will handle all markets in the replacement field. Replacement Sales will merchandise its line of engine bearings, bushings, clutch parts and front wheel parts to the National Automotive Parts Association and the export trade under the Monmouth tradename as in the past. Headquarters of the division will continue in the former Monmouth plant on Carnegie avenue in Cleveland.

Southern Research To Get Plant

Southern Research Institute's expanding metallurgical program resulted in approval by the executive committee of a new prefabricated steel building to house this division of the institute in Birmingham. Construction will begin immediately.

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How To Serve Best

American Gear Manufacturers are streamlining their organization to help industry

HOW can a trade association best serve its industry? That was a question considered at the 34th annual meeting of the American Gear Manufacturers Association at the Homestead, Hot Springs, Va., June 5-7.

AGMA members voted to streamline their group's committee setup to expedite work on standards, engineering and commercial projects that the association is doing for the industry.

What It Means — That involves, among other things, the addition of an engineer to the headquarters staff at Pittsburgh. The new setup also involves establishment of four primary activities under the main head of standards and practices committee. These activities include enclosed drives, open gears, development and industry relations. Under these are, respectively, eight, nine, eleven and nine committees covering specific activities.

John A. Redmond, Westinghouse Electric Corp., presented a paper on heat treating gears by induction heat. This covered many present applications of induction heat to gear hardening. Examples were given of contour hardening of teeth as well as through hardening. Use of automatic methods of mass production were illustrated. The other paper, by W. A. Williams, Chief Engineer, American Pulley Co., Philadelphia, was on the history of power transmission.

No less than 20 committee meetings were held during the convention, these covering practically all active engineering, management, inspection and marketing phases of the gear industry.

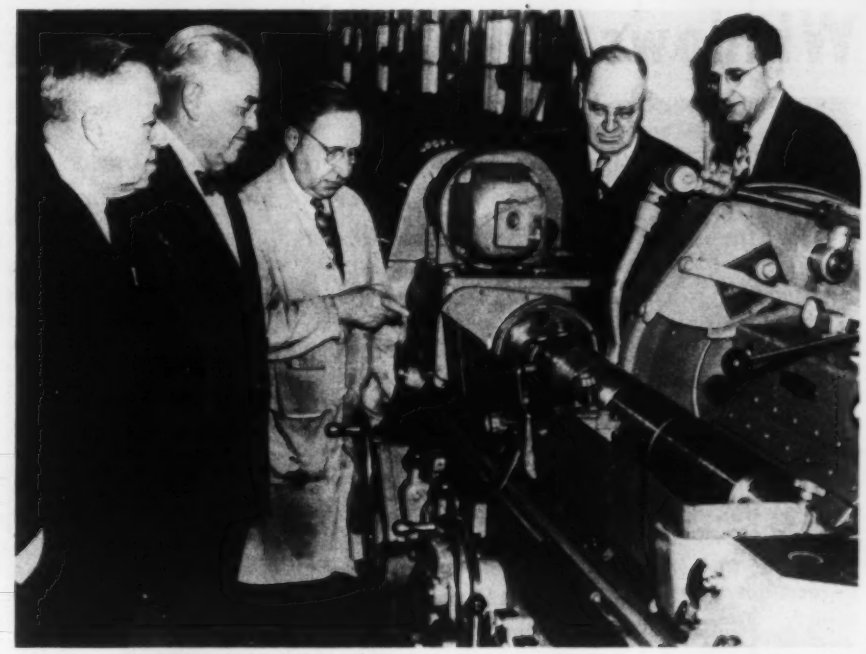
New Officials — New officers of AGMA announced at the conclusion of the convention are as follows:

President, Leroy R. Brooks, Jr., president of Tool Steel Gear & Pinion Co., Cincinnati.

Vice President, G. H. McBride, Westinghouse Electric Corp.

Treasurer, Louis B. Bond, Christiana Machine Co., subsidiary of Charles Bond Co., Philadelphia.

Members of executive committee are: J. Harper Jackson, sales manager, Jackson Gear Co., Pittsburgh; J. R. Mahan, director of engineering, National Supply Co., Toledo; Fred R. Eberhardt, president, Eberhardt-Denver Co., Denver; and Walter W. Trout, president, Lufkin Foundry & Machine Co., Lufkin, Texas. Newbold C. Goin was re-elected executive secretary with headquarters in the Empire Bldg., Pittsburgh.



AFTER 50 YEARS STILL GRINDING AWAY: This year marks the 50th anniversary of Norton Co.'s Grinder Division, Worcester, Mass. Shown in the photo is the CTU cylindrical grinding machine, modern counterpart of the first Norton grinder. Men from the Grinder Division in the picture are: Herbert J. Griffing, manager, labeler section; Frank W. Smith, vice president and manager of the division; John Cook, foreman of department No. 8; Albert G. Belden, manager, research and engineering; and Iver G. Freeman, factory manager. All of the men were among the associates of C. H. Norton, the father of cylindrical grinding, in the early development of cylindrical grinding at Norton Co.

LEROY R. BROOKS JR.

GEORGE H. McBRIDE

President and Vice President of American Gear Mfrs. Ass'n

More Quality Control Needed

Quality control "is too often the tail of the kite," charges L. D. Crusoe, vice president of Ford Motor Co. He spoke at the Milwaukee meeting of the American Society for Quality Control.

He says that introduction of quality control methods can be one way of rekindling the "pride of performance" in doing a job that is being lost in today's mass labor movement. "The need is for mass education in pride of performance at every level," he believes.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Pointing out business opportunities as they arise under the industrial and development phases of the Point Four program is the job of Thomas E. Hibben

INDUSTRY'S informational contact man in the government on the industrial development phases of the Point Four program is Thomas E. Hibben.

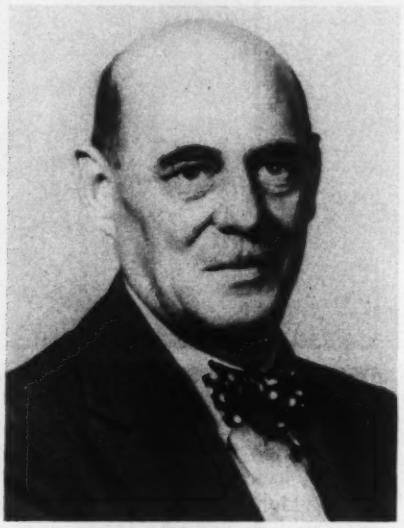
His is the responsibility for pointing out business opportunities as they arise under the program. Firms with questions about where to look for orders for their products should consult him; if he hasn't the answer he can advise where it may be obtained. Mr. Hibben is adviser on foreign economic developments to the Office of International Trade. He can be addressed at Room 3881 Commerce Building, Washington. His telephone number is STerling 9200, Extension 4014.

Where It Knocks First—Opportunities for industry at the start will lie mostly in the fields of agricultural improvement, public health, sanitation, education, public roads and, in some cases, basic utilities like power development. Industrialization of the countries to be included in the program generally will follow after these fundamental activities are organized. But the procedure for each country will be developed individually so purchases of industrial equipment here and there may loom importantly even at the start. Interested manufacturers should keep informed.

Vital Statistics—As the program develops, Mr. Hibben will prepare a series of reports—one for each country in the Point Four program. They'll be comprehensive ones—on the order of Abbink Mission's report on Brazil. They'll give population and other vital statistics and will include information about import duties, import regulations, exchange controls, laws affecting foreign investments, etc.

Preparation of the reports is nothing new to Mr. Hibben. He prepared similar studies on North Africa, Begium and Austria for the Foreign Economic Administration, on the Philippines for the Joint Philippine-United States Finance Mission, on industrialization of Puerto Rico for the Caribbean Commission, and he had a hand in writing the Abbink Mission report.

Key Spot—Though Mr. Hibben is in a key spot as far as industry is concerned, he is only one of a large number of government officials devoting all or most of their time to the Point Four program.



THOMAS E. HIBBEN
. . . informational contact man

Early last week the President authorized the Point Four program by signing the bill, but actual appropriations are still to be acted upon.

The man organizing the work is Capus L. Waynick, on leave as ambassador to Nicaragua, and now chairman of the new Interdepartmental Advisory Committee on Technical Assistance.

Twelve Hundred Experts—On this committee are representatives of the Departments of Commerce, State, Agriculture, Interior, Labor, Treasury and Defense and of many bureaus, divisions and agencies—Reclamation, Standards, Mines, Geological Survey, Education, Public Health, Public Roads, Technical Services, Army Engineers, Civil Aeronautics, Economic Cooperation Administration, etc. The units are looking for a total of some 1200 to 1400 experts to do the necessary work.

Included are various types of engineers, soil experts, public health personnel, etc.

Mr. Waynick's approach will be through surveys to be made jointly by U.S. experts and representatives of each foreign country. The surveys are meant to ascertain the resources and assets and capabilities of each country and the needs of each country. On the basis of the survey results, the actual technical assistance programs will be laid down, including arrangements for financing the programs. After that point has been reached, foreign business opportunities should begin to be available to U.S. manufacturers in increasing volume.

Sawyer Abolishes ODC

In a far-reaching reorganization, Commerce Secretary Charles Sawyer abolished the Office of Domestic Commerce and placed it in the greatly enlarged Office of Industry and Commerce.

OIC includes all of Commerce's commodity divisions. Thus there is a merger of the parallel sets of commodity units of the old ODC and the Office of International Trade. The new OIC takes over OIT's export controls, the Bureau of Standards' Division of Commercial Standards, and all transportation and communications research functions of the Commerce Department. It includes the Small Business Division which is to be greatly amplified when and as Congress approves the measure to create national capital banks and other aids to small business. It also is to include other important activities according to present plans.

H. B. McCoy, as director of the Office of Industry and Commerce, now has one of the biggest jobs in government as far as business and industry are concerned. Mr. McCoy was director of the abolished Office of Domestic Commerce. He has three assistant directors of the new OIC—Dean Bowman, in charge of all industry divisions; James C. Kelly, in charge of all functional divisions; and John F. Havener, in charge of export controls.

The emasculated Office of International Trade hereafter will be concerned with foreign trade promotion and commercial intelligence.

Business a Stone's Throw Away

If you want to do business with Uncle Sam—metalworking's biggest customer—you won't have to go far to get information on bids.

Synopses of bid invitations of the

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main procurement agencies, the armed services and the General Services Administration are now available at 931 places throughout the U. S. and its territories. The Commerce Department's Small Business Division which compiles the information says you can see the synopses at Commerce Department field offices, public libraries, chambers of commerce, boards of trade and offices of many trade associations.

Another aid to those eager to share in government business is a new 112-page "1950 Directory of Federal Purchasing Agents." It is available at $2 a copy from the Statesman Press, National Press Bldg., Washington 4.

Kit Tells Taconite Story

To dramatize his bill (H. R. 8512) to encourage taconite beneficiation, Rep. John A. Blatnik (Dem., Minn.) handed out kits containing samples of taconite, taconite concentrate and taconite concentrate agglomerated into pellets to his fellow congressmen.

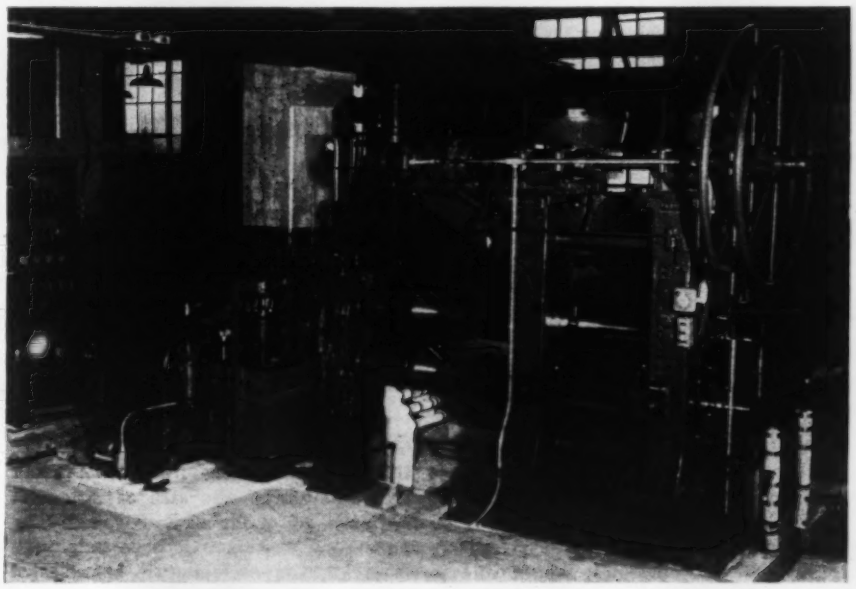
Along with the kits go pamphlets describing experiments that may be conducted with the samples—determination of magnetic properties, porosity of pellets, etc. Mr. Blatnik's bill would authorize Reconstruction Finance Corp. to grant loans in indefinite amounts up to 30 years for construction of new taconite concentrating plants. Similar loans would be granted to producers of other minerals required for national defense.

Industry Hot About Quiz

Industry spokesmen in Washington are in a furore over the action of Rep. Frank Buchanan (Dem., Pa.) (he's chairman of the House Select Committee on Lobbying) in sending a questionnaire to 166 business corporations that have been telephoning Washington for information and advice.

Here's the situation: Mr. Buchanan sent out the questionnaire on his own responsibility, without authorization by the committee and without consulting fellow Democrats on the committee. Hence business spokesmen think he is exceeding his power as committee chairman and the power that the House clothed the committee with in authorizing it to investigate lobbying. Some of the firms that received the questionnaire said they are not sure whether they will answer it; many have said that it will be very difficult to file an answer because the questionnaire calls for data going back three years.

Bureau of Standards Unit Gets a 'Face Lifting'

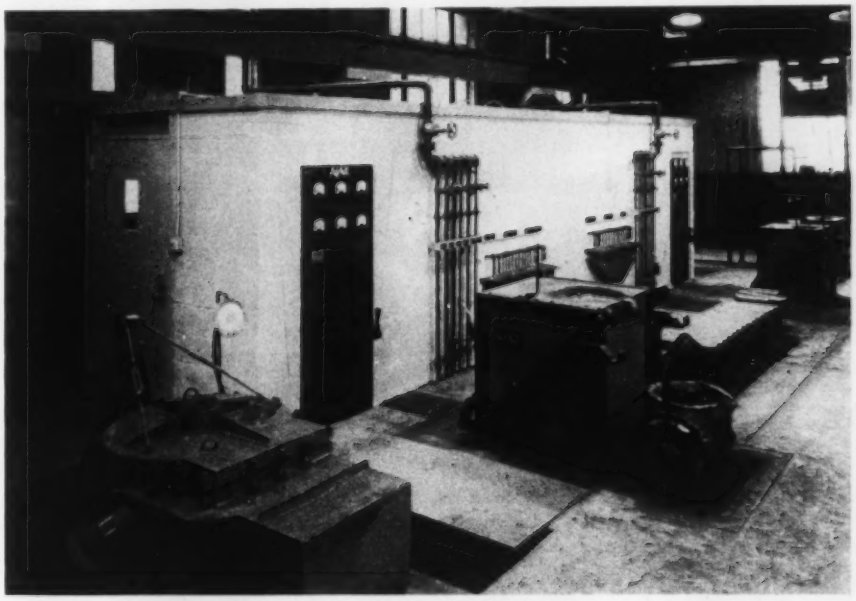


METALLURGY DIVISION'S NEW 2-HIGH, 16 X 24-INCH MILL
. . . it will take 4-inch ingots or 4-inch plate

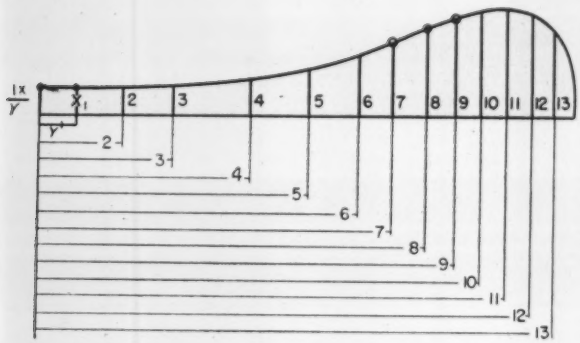
The old 16-inch rolling mill at the Division of Metallurgy in the National Bureau of Standards is no more.

Installed in World War I, it was used for rolling armor plate and on many important research programs. The investigation of boron and nitrogen-treated steels was one. The rolling mill was literally worn out. Replacing it is a modern 2-high, 16 x 24-inch reversing mill with two speeds, 31 and 62 feet per minute. The new mill, installed by Farrel-Birmingham Co. Inc., is to be used for hot and cold rolling. A distinctive feature is the provision of a pair of internally steam-heated rolls to permit such operations as rolling magnesium alloys in a temperature range of 400 to 600 degrees Fahrenheit without chilling.

Another noteworthy improvement program is under way in the foundry which now has four Ajax high-frequency induction furnaces: One 650-pound tilting furnace, one 300-pound tilting furnace, one 200-pound lift-coil furnace and one 100-pound vacuum furnace. The single generator used previously was replaced by two 250-kilowatt units.



FOUR AJAX HIGH-FREQUENCY INDUCTION FURNACES
. . . another noteworthy improvement



How Would You Do It?

The Naval Ordnance Laboratory came up with this problem: How to machine-finish the surface of a forging like the one on the left to plus or minus 6 to 8 microinches

STEEL, believing many of its readers can supply the answer, presents the problem here

DO YOU KNOW HOW these forgings can be finish-machined to plus or minus 6 to 8 microinches?

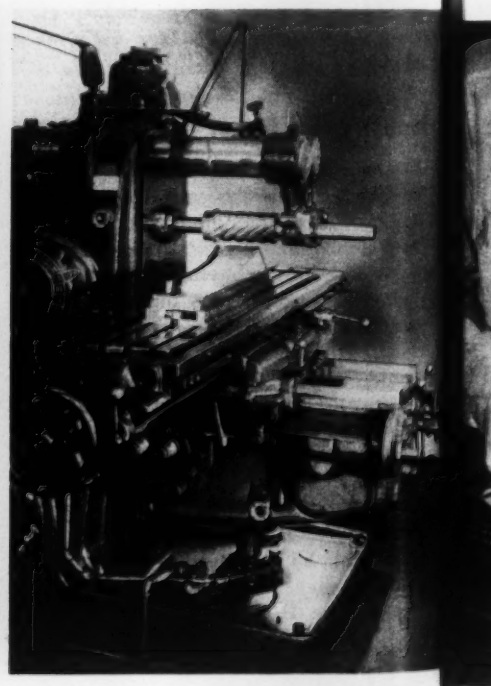
If so, Emmett L. Hunt, technical shop foreman, Naval Ordnance Laboratory, White Oak, Md., would like to hear from you. The forgings (they have been produced in brass and aluminum, and steel; other materials are under consideration) are half-sections of nozzles that govern the flow of air through NOL's big wind tunnels. A different shape and size of nozzle is required for each airflow speed. The nozzle surface that is to be machined is straight across, but it is a series of concave and convex curves of continually varying radii from front to back.

At present, Mr. Hunt is doing the preliminary machining on a horizontal milling machine. Its elevating screw was replaced by a hydraulic jack that raises the platen on which a template corresponding to the desired profile of the work-piece is mounted. This arrangement holds the template with a pressure of 40 pounds against a roller mounted on the arbor and ground to the same outside diameter as the milling cutter. With the setup a profile cut within 15 millionths of an inch is then obtained.

After that the finish is done by hand-scraping and polishing.

It is this hand work that creates the problem: It took the full time of two

PROFILE of the curved surface (line drawing above) of the nozzle halves used by the Naval Ordnance Laboratory in their wind tunnels is traced with a French curve through points located from dimensions given by a designer. Scribing the contour of the template (below) on a block of metal is the next step. The metal used is brass. The shape of nozzle halves varies with size—but in all cases the surface is a series of compound curves in the axial direction



PRELIMINARY MACHINING is done on a horizontal milling machine specially adapted to the work

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men an average of four weeks to finish every one of the six pairs of nozzle halves produced to date. And the forgings that have been finished to date are small ones—5 x 8 inches and 8 x 26 inches. Mr. Hunt thinks it will take two men at least 10 weeks to complete the hand work on a pair of 16 x 72-in. nozzle halves now in process. Much larger ones now are in the drafting stage and will add to the production problem soon.

The job is laid out as indicated in the accompanying line drawing. Dimensions are given for the ordinates, X, X-1, X-2, etc., and for the abscissas, Y, Y-1, Y-2, etc. (Only 13 of each are shown in the drawing; actually there are many more, the number depending on the size of the forging.) After the extremities are located, they are connected to form the profile of the curved surface of the forging. This line is traced with a French curve; there is a separate curve for every three consecutive points.

The next step is the forming of the template to this curved line, with subsequent rough-machining and hand-finishing.

Now, what Naval Ordnance Laboratory wants is a machine that will do the work, with or without a template, and that will eliminate the hand operations.

How would you do it?

FINAL OPERATION—the big problem—is hand rubbing the curved surface to a high gloss

Emphasis on Jets

American industry should get a larger chunk of the military aid dollar

MAJOR emphasis in the second year of the military aid program will be on jet aircraft and other tactical air equipment to be manufactured in the U. S. American business should get more business than it did in the first year of the program.

Expectations are that the program will be authorized by Congress in about the size that the President requested.

His request earmarks $75 million for American machine tools and other industrial equipment to increase armament production capacity in Western Europe. In asking for legislative action to carry out the program the President requested authority to sell arms to any nation and to receive payment in installments.

MB Meetings with Foundrymen

Discussion of foundry mobilization problems will feature meetings to be held by the Munitions Board with five subcommittees of its Foundry Industry Advisory Committee. These groups, and the dates on which they will sit, are: Gray Iron Castings subcommittee, June 14; Steel Castings subcommittee, June 15; Brass and Bronze Castings subcommittee, June 16; Cast Iron Pipe subcommittee, June 23; Aluminum and Magnesium Castings subcommittee, date not yet set.

The Machine Tool Industry Advisory Committee is to hold a meeting on a June date still to be arranged. Other meetings scheduled are: Copper and Copper Base Alloys Industry Advisory Committee, June 8; Non-Metallic Minerals Industry Advisory Committee, June 12; Nonferrous Metals Industry Advisory Committee (outside of copper), June 13; Electronics Equipment Industry Advisory Committee, June 22.

Three Naval Reports Available

Three new Office of Naval Research reports are available from the Office of Technical Services, Department of Commerce, Washington 25, D. C.: "Phosphate Coatings on Steel, Part II," PB 100 514, at 75 cents; "A Study of Mold Washes for Sand Molds," PB 100 515, at 50 cents; and "Constant Potential Anodization of Lead in Sulfuric Acid Solutions," PB 100 268, at 75 cents.

NEA

SHOT MACHINES: The U.S. Navy's new Martin KDM-1 pilotless target drones are rolling off production lines at Glenn L. Martin Co., Baltimore. They'll be used for testing the fire control systems in the war games of the fleet. In the photo the man in the foreground is testing the control system of a completed "bird" with a unit mounted on a Scorsby tilt-top table. Results are shown on the panel at the right. The target planes are fitted to a mother bird that carries the drones aloft for launching. They are powered by ramjet engines, controlled by radio and tracked by radar

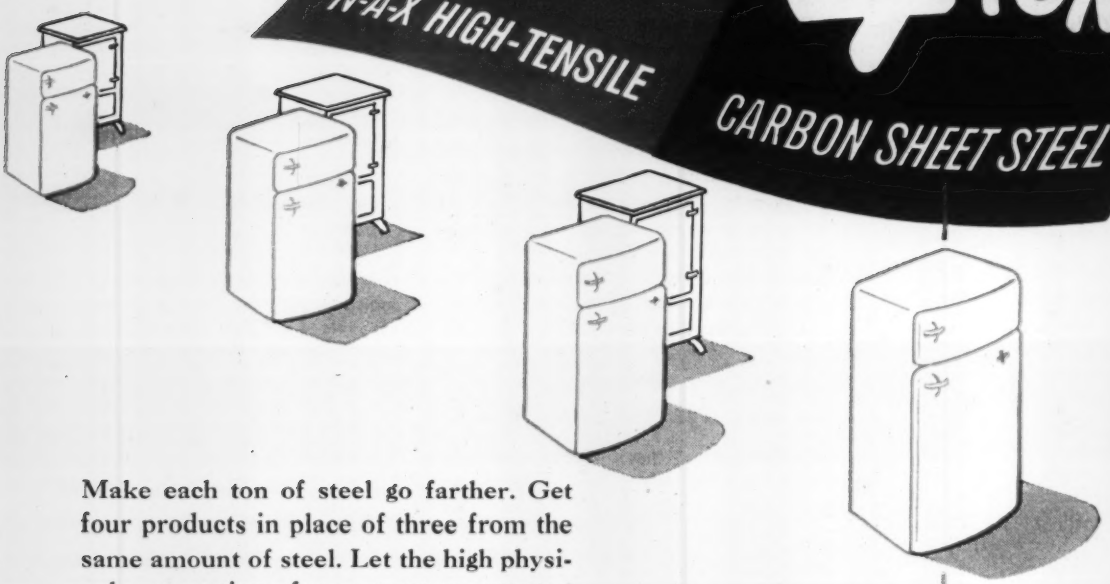
NEA

FUEL ECONOMY INDEED: The white circle in this photo shows one of the three turbines that add to the power and fuel economy of the Navy's new Wright Turbo-Cyclone 18 "Compound" engine. It's a new type of combination piston and turbine engine for use in long-range antisubmarine patrol planes. In the Lockheed P2V-4 Neptune above the new engine will stretch the non-refueling range of the plane by as much as 20 per cent. The engine is the first engine of its kind to pass a military test

the New Arithmetic in Steel

3 TONS > 4 TONS

N-A-X HIGH-TENSILE CARBON SHEET STEEL



Make each ton of steel go farther. Get four products in place of three from the same amount of steel. Let the high physical properties of N-A-X HIGH-TENSILE take the place of mass in your product design to boost production per ton as much as 33%. This new efficiency in the use of steel is part of industry's constant search for better materials.

With N-A-X HIGH-TENSILE steel you are assured of high resistance to distortion, impact fatigue and corrosion. Yet you are also assured of excellent cold formability and weldability.

Thus you can redesign many steel products with sections 25% thinner—to save weight, save steel. And further savings in fabricating and finishing pay the way to use of this better, more efficient material.

Let us talk over with you the application of N-A-X HIGH-TENSILE to your product. We believe we can show you how to increase production per ton as much as 33%.

N-A-X HIGH-TENSILE STEEL

GOES FARTHER

Builds More Products per Ton

MAKE A TON OF SHEET STEEL GO FARTHER
Specify— N-A-X HIGH-TENSILE STEEL

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Chrysler, 25 years old this month, cites some big figures to show it has reached adulthood. Twenty-eight plants contain 25 million square feet of floor space

DETROIT

APPROPRIATELY in this month of anniversaries, Chrysler Corp. lights the twenty-fifth candle on its corporate cake and comes up with some big figures to attest its lusty quarter-century growth. Back in 1925, when Maxwell Motor Corp. was reorganized to become Chrysler under the guiding genius of the late Walter P. Chrysler, the company boasted four plants, covering 3.6 million square feet of floor space, and two lines of cars, the Maxwell 4 and the Chrysler 6, the latter first introduced in New York in January, 1924, and proving a sensation of its day. The company owed the banks $18 million, creditors $35 million and had net worth of about $19.5 million. Inside of three years, Dodge had been bought out, DeSoto and Plymouth introduced, and the corporation was rolling along fabulously. Today it has 28 plants in the U. S. with nearly 25 million feet of floor space, boasts net worth in excess of $466 million, has no debts.

Accent on Engineering—Always leaning strongly on engineering development and research, Chrysler completed its present elaborate engineering facilities in Detroit in 1940, with 2600 now at work on various phases of experimentation and testing. There is talk of still broader research facilities to come, involving a large proving grounds and road test area.

Today Chrysler buys materials and services from 7701 independent suppliers in this country to the tune of $1336 million a year (1949) and over a quarter century the supply bill has totaled over $10 billion. Wages and salaries to employees, now 110,000, have added up to $3598 million; stockholders have received over $447 million in dividends. Production back in 1925 ran to 133,357 vehicles; last year it exceeded 1.2 million, marking the fifth year output exceeded a million, other years being 1936, 1937, 1940, 1941 and 1948.

Still Growing — Since the war, Chrysler has added about 5 million square feet of floor space to its plant facilities and has spent better than $215 million for tools, machinery and equipment. Manufacturing and assembly operations are concentrated in 15 plants in the Detroit area, the largest being the Dodge Main plant, where employment runs to 36,000; plus seven other units in Dayton, O., San Leandro and Los Angeles, Calif.; Evansville, Kokomo and New Castle, Ind., and Helena, Ark. Other units are parts distribution warehouses. Currently, assemblies of cars and trucks are at an alltime peak of better than 8000 daily.

DODGE SETTING RECORDS: That's what this Chrylser division is doing in daily shipments of cars to dealers. Typical shipping operation is the loading of Dodges on Great Lakes steamers like the one in the picture. The ship carries more than 500 cars to Buffalo for re-shipment to points on the Eastern Seaboard

Such is the Chrysler story. It seems hardly likely the next 25 years will duplicate the amazing virility of the past. For one thing, government taxes and high costs of employee wages and security provisions would prevent it. For another, Chrysler no longer has much of an edge, if any, engineeringwise over its competitors. Right now the corporation likely will be hard pressed to recoup the losses of this year's strike, during which many long-time owners may have switched to competing makes of cars. It will take time and perhaps "engineering daring" of the 1925 type to win them back. Certainly no one is writing off Chrysler as a major factor in the automotive industry, but the era of Walter Chrysler's meteoric rise will never be paralleled in the years to come.

Adopt Co-operative Pension Plan

The 4000 hourly-rated employees of 70 Detroit tool and die shops now are covered by a common pension trust fund providing $100 a month at age 65, including social security, and permitting them to change employment from one company to another without losing their pension equities. The plants all are members of the Automotive Tool & Die Manufacturers Association, started back in the days of NRA, and represent about 90 per cent of the tool and die capacity of the area. Trustee for the pension fund was to be named last week. The plan calls for payment of a flat 8 cents an hour for each hour worked by both skilled and unskilled employees, overtime and double time having no effect on this payment. In addition, medical hospital and insurance payments by the employees amount to roughly 2 cents an hour. The agreement runs for five years and no wage increase is involved.

Some Shops Hold Out—While the pact has been described as the first area-wide pension agreement to be reached by the UAW-CIO, actually it is not quite that, since the member companies of the association long have been negotiating as a group with the union on wages and working conditions, and the present pension setup is simply another phase of this activity. There are perhaps 40 other tool and die companies in the area, not members of the association, and therefore the 2000 men in their plants will not benefit. The tendency may be for these companies to join forces with the associated group and thereby strengthen the organization. Some will continue to go it alone, one large shop for example already having granted 7-cent hourly wage increase together with a guarantee to match any pension offer of the association.

Under the association plan, an employee must have 25 years' past service credit for the full pension. If he quits or is discharged, his service credit is not interrupted if he returns to work within 18 months and works 131 hours within the next three months for any participating employer. If he is laid off, pension

eligibility continues for three years.

Business at Crest—Automotive tool and die business is booming, particularly the heavier types of jobs, such as fenders, hoods, door panels and the like. One source estimates there are at least 20 sets of bumper dies now released to various shops, each running close to $100,000. They are for oncoming 1951 models—Packard, Chrysler divisions, some General Motors units. Also in the works is a considerable volume of tooling for automatic transmission builders, all of it exacting in character.

Ford Transmission: How It Works

A feature of the Society of Automotive Engineers summer meeting at French Lick, Ind., last week was a detailed presentation of technical and operating characteristics of the Ford-Mercury automatic transmission, now in its early manufacturing stages in two plants—Ford at Cincinnati, and Borg-Warner at Muncie, Ind. A number of changes in design and material have been made since the device first was announced and they were outlined by Harold T. Youngren, vice president-engineering, and H. G. English, assistant research engineer.

The air-cooled transmission basically comprises a three-element torque converter, planetary gearbox, two multiple-disk clutches and two brake bands, two oil pumps and a control system including pressure regulator assembly, hydraulic governor and main valve body assembly.

Fewer Shakes—The converter, with pump, turbine and one stator or reaction member, is driven from the engine through a flexible plate for minimum vibration transfer. The pump element has a die-cast aluminum cover, 31 stamped steel blades, retaining ring, torus ring and iron hub casting. The cover is cast with slots on the inside surface to receive the blade tabs, each blade being positioned in the cover by four tabs and the retaining ring. An additional two tabs project through the torus ring and are rolled over to complete the assembly. No welding is involved.

The turbine assembly is of steel stampings except for the splined hub which is a steel forging. The 33 blades are located in the outer shell by four tabs extending from the blade through the shell and held in place by the bending of the tabs. The torus ring is slipped into place over two additional tabs on each blade and these tabs are bent over by rolling.

Hub Riveted to Shell—A steel hub is riveted to the outer shell to complete the assembly. The stator or reaction member is an aluminum die casting on which a formed split steel shroud is assembled and retained by welding at the split.

The planetary gearbox employs a gearset of the double pinion type, gears being all through hardened high-carbon alloy steel. Forward sun gear and long pinions are crown-shaved, the latter being individually shaved at the two contact areas.

Pinion pins are induction-hardened SAE 1085 steel to give proper depth of hardness for the needle bearings and still maintain ends soft for staking in assembly. Internal gear is made from a ring forging instead of being integral with the driven shaft. Internal teeth are carried full length of the ring and serve as splines for attachment to the driven shaft.

Guards Against Distortion — This construction provides better control gear distortion during heat treat and results in less scrap due to the ability to salvage either ring gear or driven shaft from a rejected assembly.

Pinion carrier and low-reverse drum are of two-piece cast iron construction, giving a low cost carrier because of minimum machining and providing a desirable cast iron braking surface. Cover and carrier are riveted together permanently before final line-boring of the pinion pin holes. The gearbox carries a total of nine gears, permitting three forward ratios, two geared, one direct and one reverse ratio.

Two multiple-disk clutches and two brake bands, all hydraulically actuated, determine the path through which power flows in the various gears. The clutch assemblies employ alternate sintered bronze and steel plates, the front clutch having three bronze and two steel plates to give six friction surfaces, the rear clutch four pairs of bronze and steel plates, being engaged in reverse and high.

Oil Under Pressure — Two oil pumps, one driven at all times by the engine and one by the output shaft, deliver oil under pressure to charge the converter, actuate and control bands and clutches, and pressure lubricate the entire assembly. Pumps are of the I. X. type, both with the same diameter pump gear but of different widths. Front pump driven by the engine has a cast iron body while the rear pump body which also carries the driven shaft bushing is die cast. Cover of the rear pump is of steel, phosphate coated to eliminate initial wear and scoring. Operating pressures range from 75 psi at idle and cruising, up to 150 psi in low and reverse.

Auto, Truck Output

U. S. and Canada

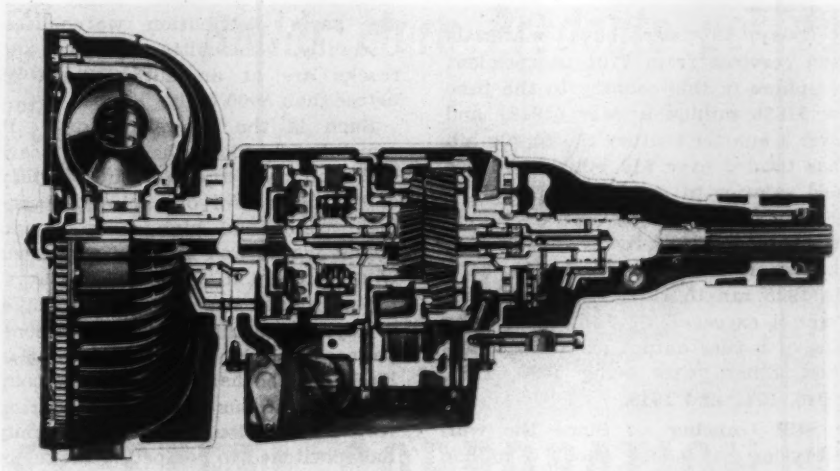
	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
Four months	2,311,858	2,002,265
May	702,000*	508,101
June		523,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
May 20	178,314	116,878
May 27	186,249	117,703
June 3	147,914	98,087
June 10	190,000	139,540

Estimates by Ward's Automotive Reports

* Preliminary.



FORD'S NEW AUTOMATIC TRANSMISSION
". . . an optimum blend of hydraulic torque converter and planetary gearing"

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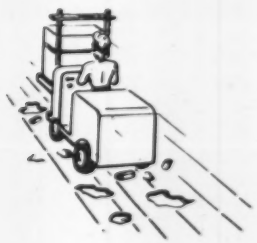
Mono-Cushion

Tough all the way through

This baby is all muscle — resilient, highly wear-resistant rubber right down to the rim. Mono-Cushions are built with plenty of beef, designed with just one thing in mind: To knock a big chunk off your tire costs.



Cushion all the way through

No cushion tire does a better job of soaking up bumps and jolts than Mono-Cushion. Rubber especially compounded for resilience plus contour designed for maximum shock absorption does the trick.

THE NEW MONARCH INDUSTRIAL CUSHION TIRE

Adds up...

. . . to an easy ride for drivers, less breakage in loads, less vehicle maintenance, lower tire costs.

The leading manufacturers of industrial trucks use Mono-Cushions as original equipment. Replacements available from the manufacturer of your equipment or his service branches.

THE MONARCH RUBBER COMPANY

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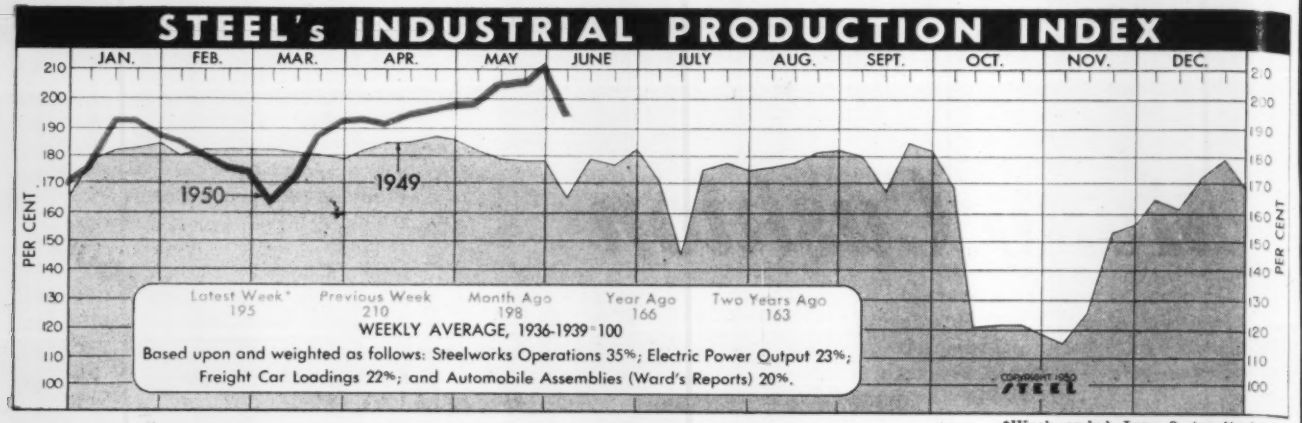
SPECIALISTS IN INDUSTRIAL SOLID TIRES


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
PER CENT
1950
1949
Latest Week* 195
Previous Week 210
Month Ago 198
Year Ago 166
Two Years Ago 163
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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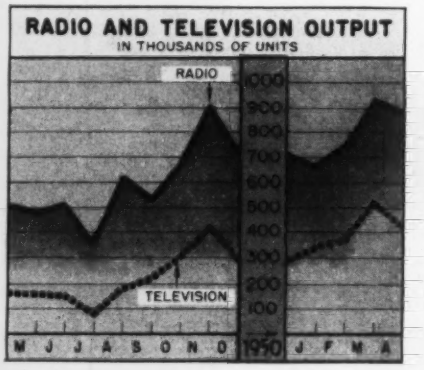
*Week ended June 3 (preliminary)



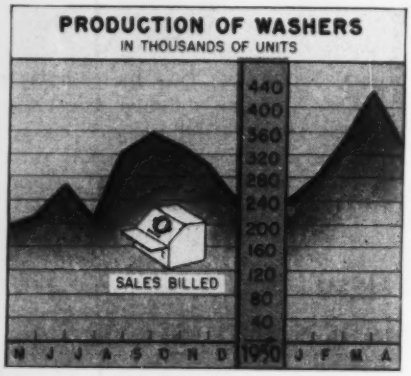
Charts—Copyright 1950, STEEL

Radio and Television Output

Thousands of Units

	Radio		Television	
	1950	1949	1950	1949
Jan.	660	710	336	121
Feb.	750	598	367	119
Mar.	980	679	525	182
Apr.	883	506	420	167
May	...	478	...	163
June	...	512	...	161
July	...	342	...	80
Aug.	...	623	...	186
Sept.	...	532	...	225
Oct.	...	670	...	305
Nov.	...	910	...	414
Dec.	...	707	...	292
Total	...	7,247	...	2,414

Radio Manufacturers Assoc.

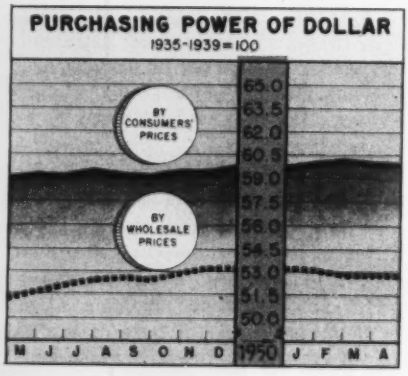


Household Washers

Sales Billed—Units

	1950	1949	1948
Jan.	275,576	172,400	360,445
Feb.	342,967	201,300	367,909
Mar.	423,802	242,500	408,512
Apr.	333,072	192,500	402,257
May	.....	211,700	377,895
June	.....	260,700	392,496
July	.....	200,900	326,181
Aug.	.....	323,789	362,169
Sept.	.....	357,281	433,919
Oct.	.....	333,728	382,400
Nov.	.....	298,717	319,300
Dec.	.....	237,591	183,700
Totals	.....	3,033,106	4,317,183

American Washer & Ironer Mfrs. Assoc.



Purchasing Power of the Dollar

As Measured by:

	Wholesale Prices		Consumers' Prices	
	1950	1949	1950	1949
Jan.	53.1	50.1	59.9	58.5
Feb.	52.7	50.9	60.1	59.2
Mar.	52.7	50.8	59.9	59.0
Apr.	52.7	51.2	59.8	58.9
May	...	51.6	...	59.1
June	...	52.0	...	59.0
July	...	52.4	...	59.3
Aug.	...	52.6	...	59.2
Sept.	...	52.4	...	59.0
Oct.	...	52.8	...	59.3
Nov.	...	53.2	...	59.3
Dec.	...	53.2	...	59.7

U. S. Office of Business Economics

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation ..May22	Ironer Sales May15	Refrigerators May29
Durable Goods....June5	Machine Tools May29	Steel Cast. May29
Fdry. Equip. Orders.May15	Mall. Iron Cast ...May22	Steel Employment..May22
Freight Cars May15	Metalwork. Wages..May22	Steel Forgings June5
Furnaces, W. Air..May8	Metalwork. Employ..May22	Steel Shipments ..May22
Gear Sales June5	Price Indexes May1	Trucks, Elec. Ind...Jan.2
Gray Iron June5	Ranges, Elec. May29	Vacuum Cleaners ..June5
Indus. Prod. .....June5.	Ranges, Gas May29	Water Heaters May29

TV Weekly Rate Stays High

Average weekly television set production remained virtually constant in March and April at just over 105,000 sets per week. Radio Manufacturers Association explains the difference between figures for the two months is because the March report covered five work-weeks and the April report four.

April's TV outturn was 420,026 sets, compared with 525,277 in March. The total for the latest month was more than two and one half times that for the corresponding month a year ago.

Radio production in April aggregated 648,352 home sets and 234,354 auto receivers. These figures represent declines from the 724,691 home sets and 255,673 auto receivers made in March but they too represent a shorter work period.

Washer Sales Begin to Ease

Standard-size household washer factory sales in the first half will be 40 to 50 per cent over 1949's like period, says H. P. Nelligan, American Home Laundry Manufacturers' Association, and president of Easy Washing Machine Corp., Syracuse, N. Y. Although the association's figures for April show a decline to 333,072 units from 423,802 in March, they are far above those for the like month a year ago and provide ample backing for Mr. Nelligan's statement.

Dryer sales dipped 7.3 per cent from 27,125 in March to 25,140 in April but were more than five times as large as in April, 1949. Ironer sales totaled 31,600 units in April, compared with 37,800 in March. They were up 74.6 per cent from last April's 18,100 units.

High level output in March and April wiped out inventory shortages in many washer lines on the dealer level.

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The Business Trend

Industry is back in stride with big production records as its goal after short holiday breather. New output marks are definite possibilities in June

AFTER taking a short breathing spell during the Memorial Day holiday week, industry is slamming away at production records again. This month will probably see a number of additional records set with a new high for the Federal Reserve Board's industrial production index a strong possibility.

In the week ended June 3 STEEL's industrial production index showed the effects of the holiday as it declined to a preliminary 195 per cent of the 1936-1939 average from 210 in the preceding week. The 210 attained one week earlier was an alltime high for the index. In the holiday week most of the decline in the index was the result of two day's lost production in many automobile plants.

Automobiles . . .

Even though the automakers closed shop for a couple of days in the week ended June 3, they assembled 147,914 passenger cars and trucks to close out a record establishing May. In the month just ended U. S. passenger car production reached an alltime record 581,317 units, 21,000 more than the former mark established last August. Without pausing for breath the automotive industry is shooting for 100,000 more passenger cars in June. All the leading passenger car builders, Independents as well as the Big Three, have their sights set on increased assembly volume for June. Truck production, while not in keeping with the fabulous feats achieved in the pasenger car field, is much better than a year ago though short of the pace in 1948 when the record was set.

Steelmaking . . .

Steelmills will continue to operate at record pace in June and tonnage produced will be near the mark established in May. There is one less day in which to pour the steel and even with slightly higher operations a new monthly record is unlikely. In the week ended June 3, steelmaking furnaces operated at 101.5 per cent of capacity for the second consecutive week and held virtually the same production rate last week.

Heavy Engineering Awards . . .

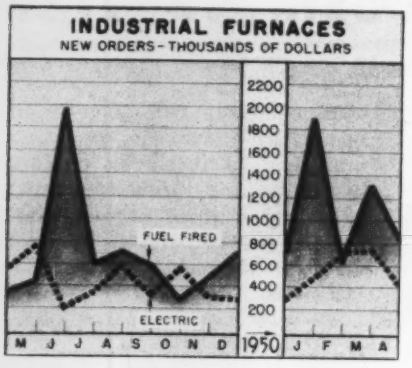
Contracts awarded for heavy engineering construction in the week ended June 1 totaled $206.5 million, 67 per cent above the same week a year ago. Thus the cumulative total for the first five months reaches $4618 million and is 46 per cent higher than in the corresponding 1949 period. Private contracts accounted for more than $100 million of the latest week's total and public contract awards topped $106 million.

Prices . . .

Wholesale prices are gathering a head of steam and moving upward. The latest advance in the Bureau of Labor Statistics wholesale price index was 0.4 per cent to 156.8 per cent of the 1926 average in the week ended May 30. Price advances are

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.5	101.5	100.5	92.0
	Electric Power Distributed (million kilowatt hours)	5,632	5,894	5,872	5,018
	Bituminous Coal Production (daily av.—1000 tons)	1,700	1,602	1,847	1,895
	Petroleum Production (daily av.—1000 bbl)	5,205	5,118	5,058	4,943
	Construction Volume (ENR—Unit $1,000,000)	$206.5	$291.2	$250.6	$123.1
	Automobile and Truck Output (Ward's—number units)	147,914	186,249	146,337	98,087
	*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	701†	781	744	699
	Business Failures (Dun & Bradstreet, number)	168	214	199	165
	Money in Circulation (in millions of dollars)‡	$27,088	$26,908	$27,051	$27,515
	Department Store Sales (changes from like wk. a yr. ago)‡	+3%	−2%	−1%	−7%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,341	$14,032	$14,599	$10,287
	Federal Gross Debt (billions)	$256.4	$256.1	$255.7	$251.7
	Bond Volume, NYSE (millions)	$12.8	$18.4	$18.8	$13.3
	Stocks Sales, NYSE (thousands of shares)	5,675	8,201	11,613	3,742
	Loans and Investments (billions)†	$67.0	$66.7	$66.5	$62.3
	United States Gov't. Obligations Held (millions)†	$36,394	$36,251	$35,920	$34,145
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	152.90
	STEEL's Nonferrous Metal Composite‡	179.0	173.9	165.7	173.7
	All Commodities†	156.8	156.1	154.5	156.2
	Metals and Metal Products†	171.3	171.0	169.6	167.6
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

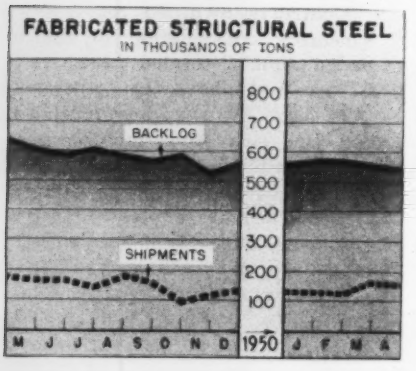


Industrial Furnaces

New Orders—Thousands of Dollars

	Fuel Fired*		Electric	
	1950	1949	1950	1949
Jan.	1,914	1,047	473	948
Feb.	616	636	697	402
Mar.	1,299	305	753	436
Apr.	837	322	415	543
May	....	438	...	762
June	....	1,978	...	196
July	....	594	...	329
Aug.	....	706	...	589
Sept.	....	589	...	318
Oct.	....	269	...	565
Nov.	....	464	...	293
Dec.	....	718	...	281

* Except for hot rolling steel.
Industrial Furnace Mfrs. Assn.

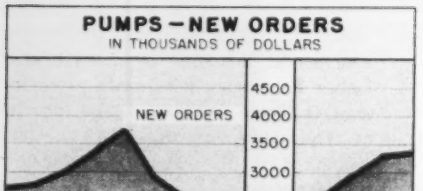


Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlog	
	1950	1949	1950	1949
Jan.	135.2	152.7	565	675
Feb.	129.6	145.9	565	683
Mar.	156.8	185.9	556	582
Apr.	155.1	179.2	540	628
May	....	171.1	...	599
June	....	172.3	...	583
July	....	148.0	...	605
Aug.	....	183.9	...	583
Sept.	....	162.1	...	562
Oct.	....	99.8	...	584
Nov.	....	117.2	...	527
Dec.	....	135.5	...	555
Total	....	1,853.5	...	...

American Institute of Steel Construction



Pumps, New Orders

In Thousands of Dollars

	1950	1949	1948
Jan.	2,586	3,390	3,819
Feb.	2,938	3,247	3,635
Mar.	3,313	3,593	4,703
Apr.	3,376	2,699	4,312
May	....	2,775	3,724
June	....	3,019	3,512
July	....	3,358	4,075
Aug.	....	3,767	4,520
Sept.	....	2,914	3,474
Oct.	....	2,539	3,571
Nov.	....	2,525	3,580
Dec.	....	2,560	4,263
Total	....	36,386	47,188

Hydraulic Institute

Charts—Copyright, 1950, STEEL

general including nonferrous metals, rubber, scrap, gasoline, meats and some steel products. The index is now 1.5 per cent above 4 weeks ago and 0.4 per cent above a year ago. STEEL's nonferrous price index reached its highest point since the end of September in the week ended June 3. It's ninth consecutive weekly advance brought the nonferrous index to 176.8 per cent of the 1936-1939 average.

Railroads . . .

Class I railroads net income in April was $38 million, falling slightly below the $40 million earned in the same month last year. In the first four months this year the railroads net income dropped to $88 million from $98 million in the like 1949 period, says the Association of American Railroads. Operating revenues in the January-April period amounted to $2699 million, a decline of 6.7 per cent from $2893 million in the corresponding four months a year ago.

Bituminous Coal . . .

Consumption and exports of bituminous coal during May, June and July will be about equal to the totals for the same months in 1949, says Appalachian Coals Inc., coal marketing agency. ACI predicts the total for the two categories will be about 110 million tons of which about 9.7 million tons will be exports. The agency points out that the recovery in coal is a tribute to a vigorous industry but points out that industrial activity is 5 to 8 per cent higher than a year ago.

Castings Ride the Tide

Foundry operations show effects of high production but industry still has capacity to spare

FOUNDRIES are sharing the benefits of high level production although current operations are not straining capacity. This year should show a better profit figure for most than was attained in 1949. Optimism is held in check by the memory of how rapidly the bottom fell out of foundry operations late in 1948 while the rest of metalworking was still going strong.

Backlogs are building up slowly in most foundry fields and they are nowhere near those attained in the immediate postwar period. Probably the biggest reason why the buildup in backogs is slow is that customers' orders are much smaller than they were in 1947-48. No great urgency exists for castings and customers are inventory conscious. No one wants to get caught with oversized inventories like those in 1949. So instead of placing 1000-ton orders as they did immediately postwar, castings users are buying for current needs in 100 ton lots.

Looks Good for a While—Gray iron foundries are operating around 70 per cent of capacity on a five-day week and backlogs are up enough to indicate a satisfactory operating level for the next four or five months. Motor castings, road building machinery, machine tools and automotive work are areas of strength.

Bureau of Labor Statistics says empoyment trends in gray iron foundries showed the first January-March gain since 1947. Production worker employment in March averaged 127,000, 2 per cent above the preceding month but 9 per cent below a year ago. Though the bureau expects a 5 per cent increase in 1950 shipments over those last year, employment is not expected to increase proportionately because of higher labor productivity.

Business Insurance — Freight car leasing programs financed by insurance companies will help both the steel and malleable foundries. Steel foundries in particular stand to gain from increased freight car buying. About 35 per cent of their total business depends on the railroads and freight cars take a sizable slice of this total. Bookings have picked up generally resulting in fair backlogs and should freight car buying continue in good volume the steel

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foundries' position will be much better than a year ago.

As long as automotive assemblies continue to roll along in high gear the malleable foundries will maintain operations around their current level which is 80 per cent of capacity. About half of all malleable castings are going into passenger cars and trucks. Backlogs for malleable foundries average about two or three months with the western foundries doing better than those in the East.

Plumbing business is the cornerstone for much of the improvement in nonferrous foundry operations. Operations generally are running about 30 per cent higher than a year ago. Despite the improvement in operations there is little growth in backlogs. Most nonferrous foundries have sufficient capacity to absorb the added work without any strain.

Nearly 60 Million on Payrolls

More than 1 million persons were added to payrolls between April and May. Census Bureau estimates that total civilian employment reached 59,731,000 in the week ended May 13, an advance of 3 million from the seasonal low reached in January and February. Most of the gains were due to seasonal expansion in agriculture, construction and outdoor work in general.

An accompanying 500,000 decline in unemployment brought the jobless total down to 3,057,000 in the week ended May 13. It was the first time this year that the unemployment total was below the total for the like month a year ago.

Harvester March-April Sales Up

International Harvester Co.'s total sales for the six months ended Apr. 30, 1950, fell 9.1 per cent from the comparable period a year earlier even though the volume for March and April was the highest for those two months in the history of the company.

International Harvester's total sales were $438.7 million for the six months ended Apr. 30, compared with $482.8 million for the same period a year earlier. The poorer total showing for the half year just completed was caused by sluggish sales in the first part of the period—November and December, 1949—that revived in 1950.

The March-April uptrend in sales is especially noteworthy, says Harvester President John L. McCaffrey, because it was not caused by the general scarcity of farm equipment products.

Builders Have Record Month in May

PROMINENT mention must be given to the construction industry when considering the many new records being posted by various industries in the first half. Construction definitely belongs in the record-setting group and its monthly totals keep moving upward despite a few areas of relative weakness.

More than $1.9 billion in new construction was put in place in May, exceeding even the seasonal peaks reached in the fall of 1948 and 1949. A joint report on May's activity released by the Labor Department's Bureau of Labor Statistics and the Commerce Department's Construction Division shows a greater than seasonal 14 per cent increase over April's total and 23 per cent over the May, 1949, total.

More Than Billion Higher—Aggregate for the first five months this year shows sizable gains over the like 1949 period. Gains were recorded in both private and public construction. Total construction is up 21 per cent this year, private is up 22 per cent and public is 19 per cent higher. Estimated total for construction put in place in the January through May period is $8074 million, against last year's $6678 million. Comparisons of private and public construction totals are shown in the chart.

Private homebuilding outlays were estimated at $825 million in May, up 15 per cent over the preceding month and 56 per cent over the same month a year ago. Nonresidential building rose to $271 million in May from $244 million a month earlier.

On the Road Back—Industrial building in the first five months shows the biggest decline from the corresponding year ago total. It is off 27 per cent. In May, however, factory building reversed a three year downtrend and climbed to $74 million from $70 million in April.

Public construction expenditures in May were estimated at $531 million, 19 per cent above April and 13 per cent more than in May, 1949. Highway construction activity rose 52 per cent over April for the largest percentage gain in public construction put in place. Reclamation and flood control also increased substantially over the April total.

It is in the public housing field that the largest percentage gain for the first five months this year over the like 1949 period is recorded. Public residential building is 115 per cent above a year ago; it totals $118 million, compared to 1949's $55 million.

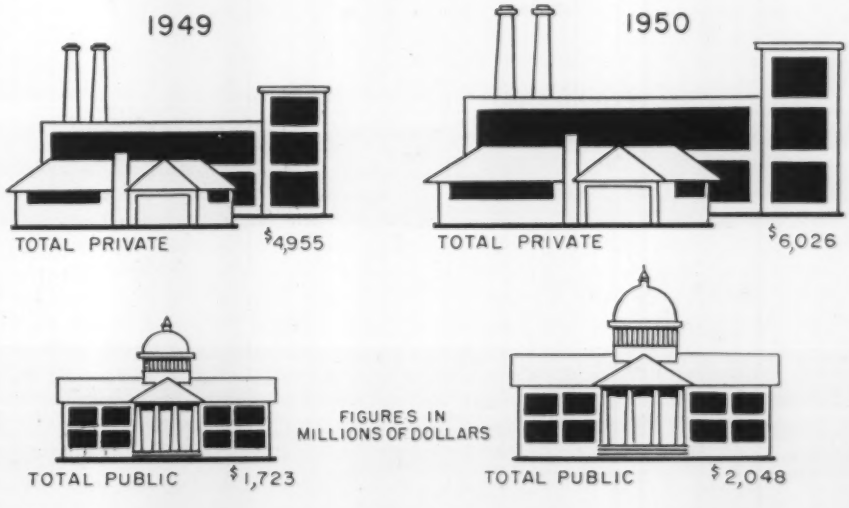
Home Buyers Getting Boost

Easier money for the prospective home buyer will give an already booming field added stimulus. Savings and loan associations, the largest source of funds for such financing, will funnel easy-to-get funds in increasing volume to home buyers, was the view expressed by dozens of executives attending the National Savings & Loan League Convention in Chicago.

They predict this trend will be spurred by the recent Congressional passage of the 1950 Housing Act which provides lower interest rates and longer maturities on government-insured loans.

Construction Totals Tower Over 1949

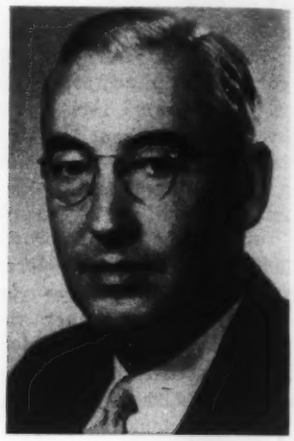
. . . January-May dollar volume 21 per cent ahead



Men of Industry

H. A. ROEMER JR.
. . . new president, Sharon Steel

A. M. TREDWELL JR.
. . . vice president, Sharon Steel



HOUSTON E. LANDIS JR.
. . . Electrol Inc. vice president

H. A. Roemer Jr. was elected president, director and a member of the executive committee, **Sharon Steel Corp.,** Sharon, Pa. He succeeds **Henry Roemer,** who has been chairman and president for the last 18 years, and continues as chairman. **A. M. Tredwell Jr.** was elected vice president of the corporation. Since 1949 he has been assistant to the president and director of personnel. **F. C. Merk** was appointed director of engineering succeeding **R. E. Carter,** who is retiring due to ill health.

Loren J. Westhaver, manager of operations, Geneva Steel Co. and Columbia Iron Mining Co., Utah subsidiaries of U. S. Steel Corp., was elected to succeed **R. G. Glass,** retired, as director, vice president and manager of operations, **Geneva Steel Co.** Mr. Westhaver also was elected a director and vice president of the **Columbia Iron Mining Co.,** succeeding Mr. Glass.

Walter W. Shipley, for many years vice president, **Laclede-Christy Co.,** St. Louis, was elected president, Laclede Arch Co., a newly created division. It will have engineering and sales headquarters in the Mallers Bldg., Chicago, and will handle industrial furnace enclosures. **Paul J. Maddox** will be vice president in charge of industrial sales.

Broderick & Bascom Rope Co., St. Louis, has acquired stock interest of the Broderick family, and **John K. Broderick** and **Arthur L. Broderick** have retired as president and vice president, respectively, and as directors. **Charles E. Bascom** was elected president of the company, and **Joseph H. Bascom** was elected first vice president and secretary-treasurer. These officers and **J. F. Hedding** of Pittsburgh constitute the new board of directors.

Trumbull Electric Mfg. Co., Plainville, Conn., as part of the reorganization of its marketing department, has appointed **Charles Bangert Jr.** product planning manager; **Yale T. Chaney,** sales engineering manager, eastern region; and **Robert C. Wilson,** sales engineering manager, central region.

William W. McDowell was appointed to head all engineering and research of **International Business Machines Corp.,** with headquarters in New York. He previously was manager, engineering laboratory, at the Endicott, N. Y., plant. **Paul F. Manieri** was appointed as assistant to vice president, **D. L. Bibby,** at Endicott.

Raymond L. Howerton is in charge of tractor equipment promotion for **Hyster Co.,** Portland, Oreg.

David Mason was appointed vice president and controller of **Link Aviation Inc.,** Binghamton, N. Y. He formerly was controller of the Ansco plant in Binghamton.

Max D. Howell, assistant to president, vice president, secretary and treasurer, United States Steel Corp. of Delaware, was elected vice president and treasurer of **United States Steel Corp.,** New Jersey, effective July 1. He succeeds **Gordon L. Edwards** who retires this month after more than 50 years of service with the company and one of its predecessor companies, National Tube.

Houston E. Landis Jr. was elected vice president, **Electrol Inc.,** Kingston, N. Y. He formerly was with Air Reduction Sales Co. as president of Ohio Chemical & Mfg. Co., and vice president of Arcrods Corp., two subsidiaries.

E. A. Carpenter was appointed Chicago district sales manager, **Firth Sterling Steel & Carbide Corp.,** McKeesport, Pa. Prior to joining the organization in 1941, he was associated with Perfection Gear Co., Harvey, Ill., as industrial engineer. **C. E. Hughes** was appointed district sales manager of the newly created southern district, with headquarters in Birmingham.

Edmund A. Watson was appointed general improvement engineer, **American Car & Foundry Co.,** New York. He succeeds **John W. Sheffer,** retired.

Midvale Co., Philadelphia, appointed **J. J. Mataitis** as tool engineer, in charge of tool materials, tool designing, as well as manufacturing, storage and issuance of machining tools.

Philip Smith, formerly general manager, Chauncy, N. Y., plant, Indiana Steel Products Co., was appointed assistant general manager, **National Seal Co.,** Van Wert, O., subsidiary of National Motor Bearing Co. Inc.

William R. Stedman succeeds **Thomas J. McParland,** retired, as general superintendent, West Virginia and Kentucky divisions, **United States Coal & Coke Co.,** subsidiary, U. S. Steel Corp., Pittsburgh. Also promoted was **Lloyd M. Lineberry** to assistant gen-

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Tops FOR DESK TOP ASSEMBLY

says GENERAL FIREPROOFING

World-Renowned Manufacturer of Metal Business Furniture

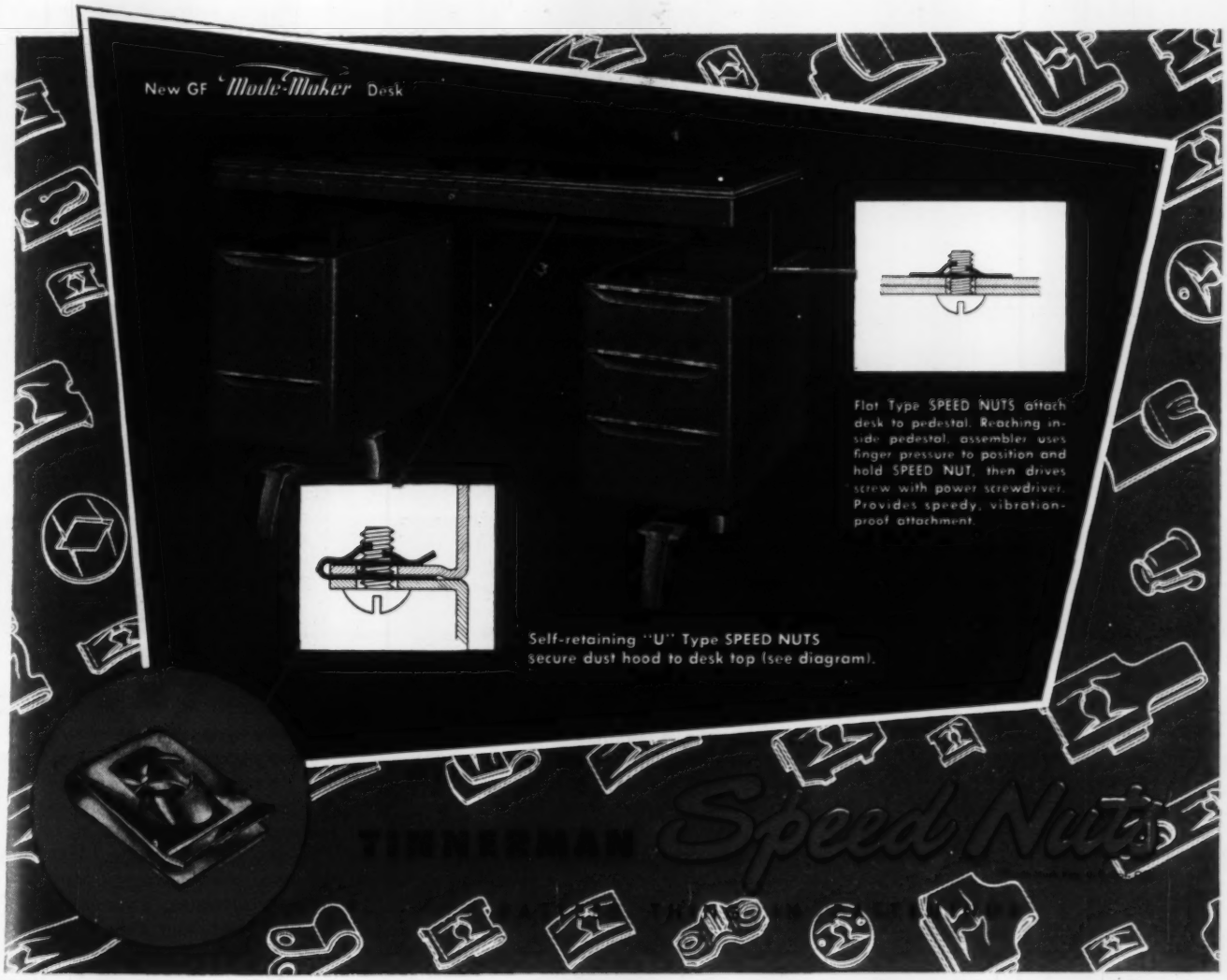
Tests prove that SPEED NUTS® produce an assembly savings of 40% over other fastening methods. That's the report supplied by General Fireproofing engineers after analyzing various methods of attaching Mode-Maker* desk tops to pedestals.

For faster, easier, vibration-proof attachments, SPEED NUTS were proved definitely superior. On the basis of these recent tests, GF plans to increase their use of SPEED NUTS to millions more per year.

*T. M. Reg. U. S. Pat. Off.

Join the thousands of manufacturers who are converting costs to profits by specifying SPEED NUT brand fasteners. A thorough Tinnerman Fastening Analysis is the first step. Ask your Tinnerman representative for details.

Write for your copy of the "Savings Stories" booklet of actual case histories. TINNERMAN PRODUCTS, INC., Cleveland, Ohio. In Canada: Dominion Fasteners Ltd., Hamilton. In England: Simmonds Aerocessories, Ltd., Treforest, Wales.


New GF "Mode-Maker" Desk
Flat Type SPEED NUTS attach desk to pedestal. Reaching inside pedestal, assembler uses finger pressure to position and hold SPEED NUT, then drives screw with power screwdriver. Provides speedy, vibration-proof attachment.
Self-retaining "U" Type SPEED NUTS secure dust hood to desk top (see diagram).
TINNERMAN Speed Nuts

eral superintendent, West Virginia division, succeeding Mr. Stedman.

Robert E. Ward and **Ralph D. Ferguson** were appointed manager and sales manager, respectively, of the **Eclipse-Pioneer Division** foundry,

ROBERT E. WARD
. . . manager, Eclipse-Pioneer foundry

Bendix Aviation Corp., Teterboro, N. J. Mr. Ward previously was director of metallurgy for the division, and Mr. Ferguson was assistant manager of the foundry.

F. W. Marschner was appointed vice president and manager of the newly opened office of **J. M. Hickerson Inc.,** Fisher Bldg., Detroit. Formerly with the New Departure Division, General Motors Corp., he retired last November, and has spent several months on vacation.

Allis-Chalmers Mfg. Co., Milwaukee, announces district office management appointments effective July 1: **J. H. Burrus,** Milwaukee; **U. E. Sandelin,** Portland, Oreg.; and **Stephen C. Bacon,** Seattle. Mr. Burrus succeeds **H. A. Balding,** retiring from active management of the Milwaukee district, but who will act as consultant and adviser to the district manager there.

John E. Jass was appointed assistant chief engineer, engineering department, **Caterpillar Tractor Co.,** Peoria, Ill. **Thomas M. Logan** joins the service department as service development manager, continuing his contribution toward engineering design as it is influenced by field service conditions. **C. L. Kepner** succeeds Mr. Jass in supervision of design of cable controls, hydraulic controls, tool bars, allied equipment and bulldozers. Supervision of specifications for comparative analysis as used in design is delegated to **Randall Roman. Paul B. Benner** becomes supervising engineer of all tractor chassis. **Richard S. Frank** will be general supervisor over the five supervising engineers, engine design division. **William G. Johnson** heads up the applied mechanics division as heretofore, and will also administer engineering supervision of basic engine design, formerly the responsibility of Mr. Frank. **M. B. Morgan** will supervise all cooling, such as radiators, heat exchangers, water pump design, etc.

Edmund F. Martin was appointed general manager, Lackawanna, N. Y., plant, **Bethlehem Steel Co.,** succeeding **A. H. Shonkwiler,** resigned. Mr. Martin has been acting general manager since the first of the year.

Electrochemical Society Inc., New York, named as president **Dr. Charles L. Faust,** head of electrochemical engineering research at Battelle Memorial Institute, Columbus, O. **R. J.**

DR. CHARLES L. FAUST
. . . Electrochemical Society president

McKay, chemical engineer, International Nickel Co., was elected a vice president. Immediate past president is **A. L. Ferguson,** professor of chemistry, University of Michigan.

National Roll & Foundry Co., Pittsburgh, appointed **R. W. Berg** to its sales staff. Until recently he was with Torrington Co. as district sales manager.

Charles T. Morgan was appointed manufacturer's representative in eastern New England for **Sperry Products Inc.,** Danbury, Conn.

Ellery W. Stone was elected president, **American Cable & Radio Corp.,** New York, affiliate of International Telephone & Telegraph Corp., succeeding the late **Kenneth E. Stockton.**

George T. Fraser was appointed assistant manager, tool steel sales, **Crucible Steel Co. of America,** New York. Mr. Fraser now makes his headquarters at Syracuse, N. Y.

J. William Schaeffer was named head of the standards section, production control department, **Hunt-Spiller Mfg. Corp.,** Boston.

Dearborn Chemical Co., Chicago, appointed **W. A. Lutsch** as manager of its branch office operations in Detroit and in Michigan.

Donald E. Mason was appointed general sales manager, **Colonial Rubber Co.,** Ravenna, O.

Harry M. Evans was appointed manager, San Francisco branch, **A. O. Smith Corp.,** replacing **J. J. Stahl,** named assistant western sales manager of the motor division at Los Angeles.

W. A. Steiger was appointed manager, patent department, **Westinghouse Electric Corp.,** Pittsburgh, and continues as general patent attorney for the corporation. **G. M. Crawford** was appointed manager of the patent division, East Pittsburgh, Pa., plant, and **William F. Kelly** of the Bloomfield, N. J., plant.

F. S. Mallette was appointed to the post of assistant director of research, air and stream pollution control, for **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp. Mr. Mallette, who is completing work on his doctorate degree at the University of Chicago, has been pursuing

F. S. MALLETTE
. . . studies pollution control, A S & W

the study of industrial toxicology and solving industrial pollution problems for the last 25 years. **William R. Herman** was named director, organization planning division, operating department, and **Frank E. Bell** was named staff industrial engineer,

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PAUL C. VAN CLEAVE
. . . sales V. P., U. S. Steel Supply

MARCUS J. AURELIUS
. . . sales V. P., Columbia Steel

AUSTIN E. COLE
. . . treasurer, Illinois Tool Works

classification and position planning division, industrial engineering department.

Paul C. Van Cleave was elected sales vice president and a director of **United States Steel Supply Co.,** Chicago warehousing subsidiary, U. S. Steel Corp. For the last year and a half he was district manager of the Los Angeles warehouse. He assumes his new duties July 1, succeeding **Marcus J. Aurelius.**

Norman F. Yount was named division controller and administrative assistant to **Walt r Holmquist,** executive vice president of **Copperweld Steel Co.,** Warren, O. In addition to general supervision of accounting, he is responsible for public relations and all administrative functions. **Joseph W. Kennedy Jr.** is operating assistant to Mr. Holmquist.

W. F. Lisman, former president of Leland Electric Co., was appointed vice president in charge of sales, **Brown-Brockmeyer Co.,** Dayton, O. Appointed sales representatives are **F. E. Schumacher,** Chicago; **A. M. Hill,** St. Louis, covering eastern Missouri, southern Illinois, and Arkansas; **F. B. Larsen,** Philadelphia, to handle eastern Pennsylvania, Maryland and Delaware; **E. A. Linhart,** Pittsburgh, to cover eastern Pennsylvania; **Louis Ellinger,** to cover Connecticut. **Ralph Cockroft** will cover southern California.

Marcus J. Aurelius was elected sales vice president, **Columbia Steel Co.,** San Francisco, subsidiary, U. S. Steel Corp. He succeeds **O. L. Pringle,** who remains a vice president and becomes a special assistant to **Alden G. Roach,** president. Mr. Aurelius, who was sales vice president, United States Steel Supply Co., Chicago, another U. S. Steel subsidiary, will assume his new duties July 1.

David J. Gemmell was elected executive vice president, **Cleveland Chain & Mfg. Co.,** Cleveland. He will continue to direct the company's national sales program, and will assume new duties in conjunction with over-all company policy.

Robert S. Neblett was appointed assistant manager of sales, turbine divisions, apparatus department, **General Electric Co.,** Schenectady, N. Y., assuming the position July 1. Appointments in the apparatus department, Atlantic district, include **F. L. Headley** as assistant manager, Pittsburgh apparatus sales office, replacing the present office manager, **Joseph Bryan** upon his retirement; **N. L. Whitecotton,** manager, Philadelphia, apparatus sales office, succeeding Mr. Headley; **F. I. Kittredge,** manager, Philadelphia apparatus sales office's industrial customer division; and **W. C. Mason,** Atlantic district manager, agency and resale division, who will have headquarters in Philadelphia.

Austin E. Cole was elected treasurer, **Illinois Tool Works,** Chicago, which he joined in 1936. He previously was with Fairbanks, Morse & Co.

W. S. Hartford, general sales manager, was made vice president-sales, **Webster-Chicago Corp.,** Chicago. G. **B. Dale** was elected vice president-research.

Jones & Laughlin Steel Corp., Pittsburgh, appointed **Herbert Johnson** assistant vice president-sales, and **Milton H. Jacob,** director of personnel relations.

Ralph B. Knight was named assistant general manager, **Rochester Products Division,** Rochester, N. Y., General Motors Corp. He is succeeded as works manager by **Rea I. Hahn,** chief research engineer in charge of tubing development.

Sam Boyer was promoted to eastern district sales manager and a director, **Darwin & Milner Inc.,** Cleveland.

Following completion of a training program, **Electric Controller & Mfg. Co.,** Cleveland, assigned to respective district sales offices: **N. M. Hodapp** and **C. F. Murphy Jr.,** New York; **I. H. Peak,** Philadelphia; **J. H. Hutson,** Birmingham; **C. A. Mitchell,** Houston; **H. E. Scheidle,** Pittsburgh; **C. B. Chapman Jr.,** Chicago; **R. M. Funkhouser** and **D. H. McGalliard,** Cleveland.

OBITUARIES...

Furman C. Arthur, vice president and secretary, **Metals Disintegrating Co. Inc.,** Elizabeth, N. J., was killed in an automobile accident May 20.

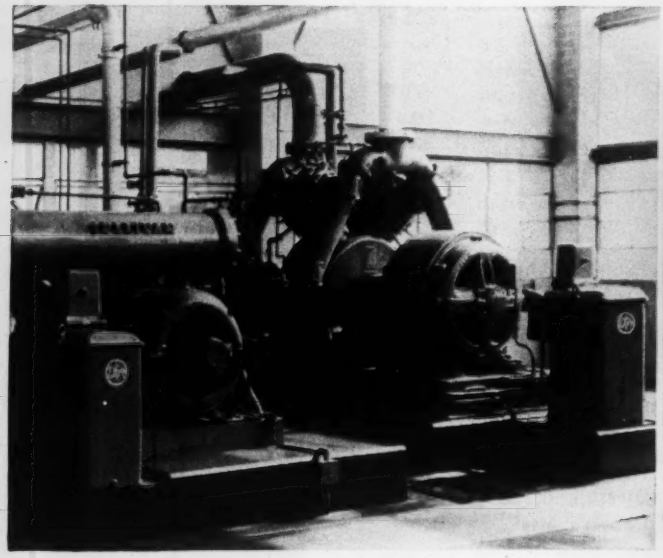
John G. Wilson, 49, executive vice president, **RCA Victor Division,** Radio Corp. of America, Camden, N. J., died June 2 at Wynnewood, Pa.

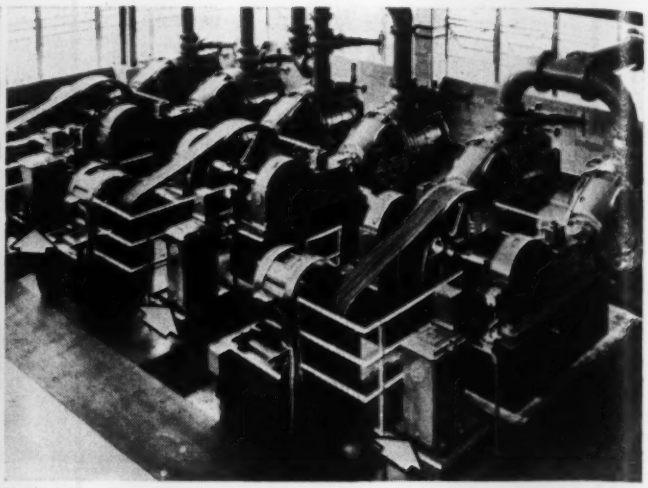
Paul M. Haack, 53, assistant secretary, **Louis Allis Co.,** Milwaukee, died June 3.

Ralph Prater, 54, founder and owner, **Prater Pulverizing Co.,** Chicago, died at his home in Los Angeles May 28.

William E. Paulson, 68, president, **Thomas Paulson & Son Inc.,** Brooklyn, N. Y., died May 31.

Harry Blake, 78, chairman of the board of **Barber & Ross Co.,** Washington, died recently.





. . . ON AIR COMPRESSORS . . . ON VACUUM PUMPS

In Protected Rooms, in Coastal Atmospheres, in Dusty Locations...

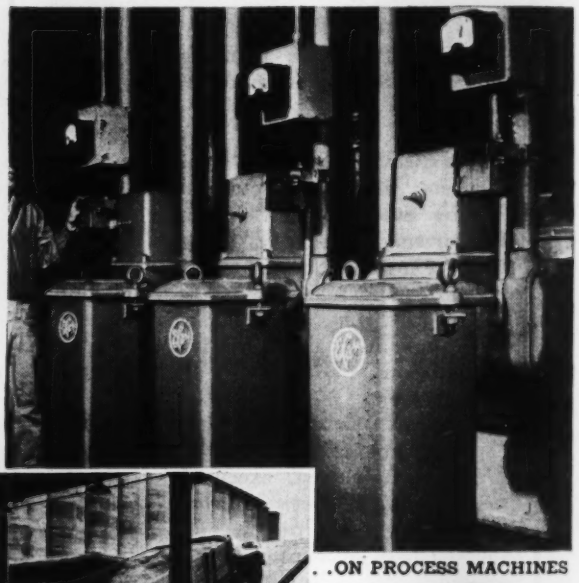
EC&M OIL-IMMERSED MOTOR STARTERS

HELP SPEED PRODUCTION IN GULF COAST PLANT

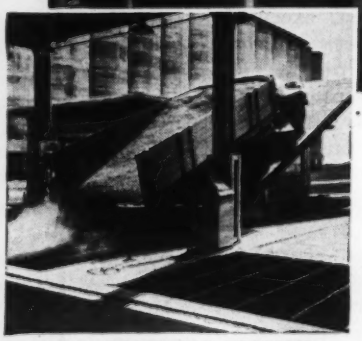
These EC&M reduced-voltage Motor Starters are very popular in industrial plants. *Automatic operation* from push-button stations brings squirrel-cage or synchronous motors up to speed quickly, safely—with greater skill than human hands can do it.

Oil-immersed, the simple double-throw contactor is always well lubricated and protected from corrosion—eliminating the need for frequent inspection or maintenance. Motor circuits are made and broken under oil—thoroughly safe, no dust hazards.

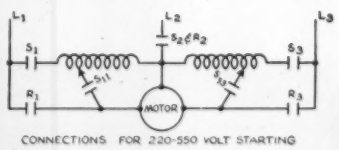
Magnetic overload relays in these starters give inverse-time-element protection and also *trip instantly* on heavy over-currents. A magnetic balance in each relay absorbs heavy starting currents and allows a *low* current-setting for accurate protection under running conditions. EC&M Motor Starters have a reputation for low up-keep cost.



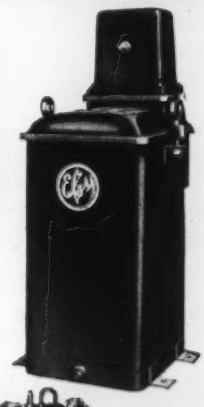
. .ON PROCESS MACHINES



GRAIN RECEIVING STATION



CONNECTIONS FOR 220-550 VOLT STARTING



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Compensator mechanism

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Production AND Engineering
NEWS AT A GLANCE

NEW EXTRUSION PROCESS— By using tiny atomized particles of magnesium alloys averaging about 0.006-inch in diameter in a new process described by R. S. Busk and T. E. Leontis of Dow Chemical Co., magnesium extrusions can be produced in standard extrusion equipment to property levels in excess of those obtainable from commercial magnesium alloy extrusions produced from solid billets. The process consists of producing small atomized particles by blasting a molten stream of metal with a stream of gas, and using them in standard extrusion equipment where they are compressed in containers and extruded in the usual manner.

EXTENDS LOAD RANGES— L-type universal testing machines now can be provided with extra low test ranges by attachment of a new electronic null system developed by Tinius Olsen Testing Machine Co., Willow Grove, Pa. Unit, which can be added to any machine in standard capacity up to 600,000 pounds per square inch, operates without necessity of stopping the test while load change is being made. A 600,000 pound machine with a secondary range of 10,000 pounds, for example, can be provided with an extra low range of 1000 pounds in 2-pound increments. System has only three moving parts. It receives signals from the developed hydraulic pressure in the machine cylinder, electronically translating them into rotary motion of the pointer.

SMALL BUT EFFECTIVE— Tools do not have to be large and complicated to save money. At the Seattle Port of Embarkation, a $4.25 device is cutting man-hour requirements by a third and saving about $1040 annually in box banding operations. According to the Department of Defense, Washington, the square stool-like device, developed by a port employee, moves on roller wheels. It has intersecting slots on its surface which allow the banding metal to be slipped around boxes.

WHISKS OFF RUST ON CONTACT— Scully Engineering Ltd., Los Angeles, reports it is now manufacturing a wartime chemical cleaner for pre and post cleaning welding and silver brazing joints. Product, according to the company, can be used as a flux and currently is used for preparing sweat fittings on copper and brass tubing. It removes rust from steel immediately on contact, and is nonflammable, nontoxic and can be used without danger to hands or face. It also removes fluxes and heat scale.

THREE RUNS ON ONE HIT— Compressor blades for jet engines which previously were made of type 403 stainless steel by precision forging now are made by a powder metallurgy process developed by Thompson Products, Cleveland. New process results in increased production, ease in maintaining critical tolerances and a saving in alloying elements. In the process, parts are pressed from iron powder made from refined and reduced mill scale, sintered, coined to obtain trailing edge and put through a hydrogen atmosphere furnace in conjunction with a copper alloy slug which fills the pores by capillary action. Parts then are heat treated to give a resulting tensile strength of 100,000 pounds per square inch. They finally are recoined and given a chromizing treatment that provides a corrosion-resistant surface containing 60 per cent chromium.

COSTS HIGH?—If your operating costs are high, you might consider what General Motors is doing in its war against high manufacturing costs. Its prime weapon is standardization. Setting up the program required a bit of engineering, but it is paying off handsomely. It is based on co-ordinated technical and engineering know-how of all of the company's 36 operating divisions. How it functions is a story few metalworking concerns, large or small, can afford to miss. (p. 90)

TUMBLES FABRICATION COSTS— Latest blast cleaning techniques are proving profitable to Servel in two ways. They are helping cut fabrication costs and improving refrigeration by providing better heat transfer. Setup used simplifies aluminum coating and bonding steel refrigerator components. Parts, some of which are intricate, are processed in two passes through the blast stream at a speed sufficient to keep three men busy, loading, unloading and turning the pieces. (p. 94)

INSPECTION PLUS — Tremendous expansion of the oil refining, natural gas and chemical industries is making heavy demands on pipe fittings of the butt welding type. Contrary to common belief, production procedures in manufacturing these fittings require surprisingly exacting measures in order to meet resistance of high pressures and temperatures or action of highly corrosive substances. To assure precision manufacture of these fittings, strict production controls are a must. At Midwest Piping & Supply Co. Inc., all phases of production, from metallurgy through heat treating, machining and welding, are under the "watchful eyes" of special control devices. (p. 95)

COATING STAYS PUT—Sendzimir process used in four of Armco's plants is a radical departure from conventional sheet galvanizing practice. Its performance is so precise that the coating imparted to sheets can withstand severe spinning, forming and drawing operations without peeling. Method also is broadening applications of galvanized sheet in that it is giving metal fabricators a material that offers better rust protection to users of their products. (p. 102)

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STANDARDIZATION—GM's N

Against High Manufacturing Costs

Vast improvements in manufacturing efficiency have resulted from co-ordination of technical and engineering knowledge involving materials, processes, equipment and general shop practices of all General Motors' 36 operating divisions. How the program functions is a story few metalworking companies, large or small, can afford to miss

By A. H. ALLEN
Detroit Editor, STEEL

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PROBLEMS posed by ever-increasing manufacturing costs resulting from higher prices on materials, higher wages and the demand for a better product, both in appearance and performance, require the use of all skills and techniques available in an organization, large or small, to insure minimum operating costs and to maintain a high competitive standard of product. How this is being done in a large-scale operation, General Motors Corp., will be explained in the following discussion.

The corporation comprises 44 divisions, 36 of them classified as the operating type, of which three are in Canada. The 33 U. S. operating divisions cover 103 plants in 59 cities in 17 states. Of these, 33 are assembly plants, in 22 cities in 13 states, while 64 are manufacturing plants, in 38 cities in nine states. Among the latter are seven major plant sites or areas included as a single unit.

If this does not give a sufficiently clear idea of the complexity and size of General Motors, consider that last year the business sold over $5.7 *billion* worth of product, employed an average of 401,326 hourly and salaried personnel, was owned by 434,075 stockholders, and showed gross book value of real estate, plants and equipment as of Dec. 31, 1949, amounting to $1,776,103,965.

Engineering Knowledge Co-ordinated—While each of the 36 operating GM divisions is autonomous, except for central policy determinations, it became obvious many years ago that better overall manufacturing efficiency could be realized by a co-ordination of technical and engineering knowledge of all units. So there was organized in the corporation's central office an agency to work out such co-ordination and to supervise its functioning on a continuing basis, not as concerns the end product of any division but rather materials, processes, equipment and general shop practices common to each.

This activity has been greatly accelerated in the years since the war, because of the pressure on costs. Today the direction of this activity is in the hands of what is known as the production engineering section of the facilities and processes staff, whose functioning and organization is discussed here.

Twelve Committees—Production engineering encompasses 12 major activities, or committees. Four of them come under a classification covering equipment and operations; the other eight are classified under materials and processes. These jurisdictional committees are as follows:

Equipment and Operations Committees — Master mechanics, plant engineers, materials handling, chief inspectors (recently activated).

Materials and Processes Committees—Chemistry, foundry, industrial waste control, metallurgical, painting, plating, preservation-packing, shop lubrication.

Members of these so-called "main" committees are named by the division general managers and normally there is at least one man for each division. These committees appoint smaller supervisory committees which determine procedures and direct activities of the various groups working under each committee. Each supervisory committee selects its own chairman who serves for a one-year term.

Working Groups—Under the supervisory committees come the working groups and in all there are 82 in the 12 fields listed above. This makes a total of 94 co-ordinated teams throughout the corporation collaborating for their mutual and collective benefit. The number of working groups under each supervisory committee may range from one to as many as 25, in the case of the metallurgical committee. A single working group may number from five to as high as 80 men and it is usually in process of continual revision as far as personnel is concerned. There is also close liaison among the working groups.

Groups hold regular meetings, averaging about one per quarter. The gatherings are scheduled 15-30 days in advance and the production engineering section in Detroit notifies members of meetings which may be held in any one of the GM manufacturing plant cities, with a large number held in Detroit. Careful co-ordination and scheduling of the group meetings is necessary to avoid having too many key men away from one plant at the same time. This is the responsibility of representatives of the PES, as is the reporting of deliberations at the meetings. Mimeographed reports are prepared, covering the subject matter of each meeting, and these are mailed to all

NO. 1 WEAPON

members, as well as to top division executives.

The PES also concerns itself with two other publishing activities. One is a four-page monthly bulletin, *Industrial Trends,* started in November, 1946, which gives highlights of cost-saving ideas gleaned from the technical literature. It is sent to a list of 500-600 corporation technicians, engineers and executives. The other is regular bulletins prepared for the committees. These carry in-plant information on cost-savings, giving complete details and illustrations of new methods, processes, revisions in procedure, with actual dollar-and-cents economies realized.

Typical Committee—Consider a typical committee—materials handling—one of the latest to be organized. An accompanying illustration shows an organizational chart, indicating the eight working groups and the various responsibilities of each. The supervisory committee, which might be termed the administrative or steering committee, comprises chairmen of the eight subcommittees. It is the responsibility of this steering group to scrutinize all subcommittee reports pertaining to the investigation of special projects in order to determine whether they are adequately covered before presentation to the main committee for acceptance or rejection, and to analyze policy problems and subjects which do not fall within the jurisdiction of any of the specialized subcommittees.

Responsibilities of each working group are carefully delineated. Take a single case—industrial trucking. This group is charged with the task of "investigating all problems having to do with the operation of industrial trucks, including maintenance and operating costs, selection of proper equipment, standardization, new applications, accessory devices, and driver training and safety regulations".

Varied Duties—Note next the varied duties of the metallurgical committee. It considers all subjects related to productive material specifications, metallurgical practices, material processing, test methods and the like. It supervises the format, publication and distribution of a *Materials and Processes Standards* book, in which are included standards developed by all of the "materials and processes" committees. It outlines policies on material usage; formulates specifications under which material is procured; prescribes processes of working material into form; establishes methods of treating materials to enhance its properties; sets up methods of test, examination and inspection, and develops recommendations for material processing to obtain desired characteristics either in the material or the finished product or both.

Under its aegis come working groups concerned with color codes for steel bar identification, electrolytic polishing, felt and fabric, fluorescent penetrants for inspection purposes, hardenability and physical properties; heat treatment, high-frequency and flame hard-

Fig. 1 (above)—"Shirtsleeves" approach to committee work on standardization, with the abrasive materials subcommittee of a main plating committee studying the polishing of rear bumpers during plating operations at the Pontiac Motor Division plant. Representatives of eleven GM plants are in attendance

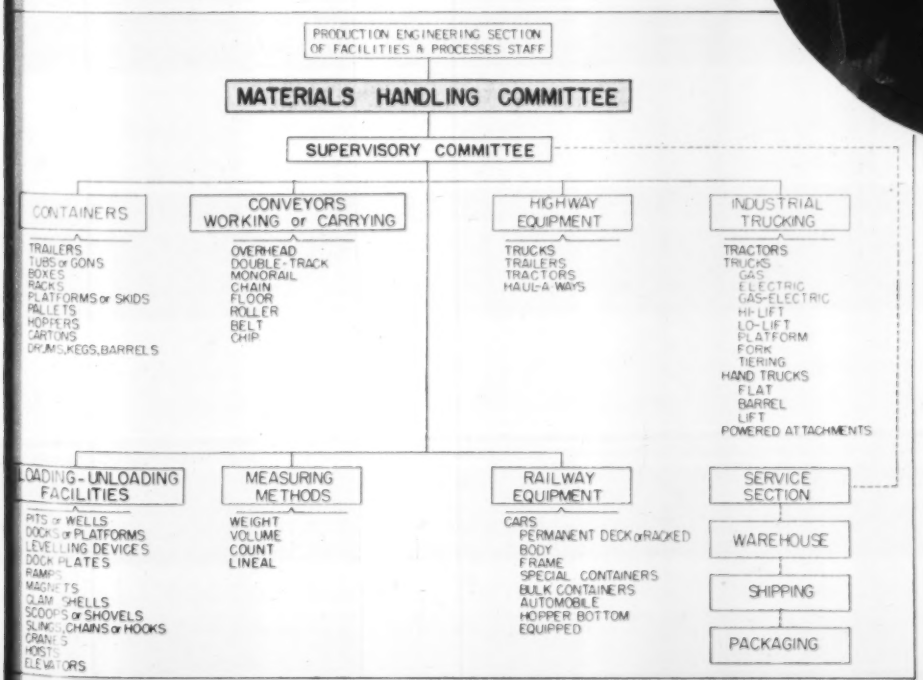

Fig. 2 (left) — Organization chart showing in detail the various activities grouped under the materials handling committee

ening, joining processes, magnetic particle inspection, metallography, nonferrous metals, plastics, productive steel, radiographic tests, rubber, salt baths, sheet steel, shot peening, specification forms, spring materials, standard parts materials, steel castings, steel tubing, tool steel, and valve and noncorrosive steels. The metallurgical committee activities rank as the oldest in the entire production engineering organization.

Master Mechanics Group—A third major committee, now functioning for some years, is the master mechanics group. An accompanying chart shows its organization and 50-odd subjects covered. It might be observed that some of the activities appear to overlap those of the metallurgical committee because of similarity of names.

Another important committee activity is the plant engineers'. Fig. 4 shows the organization of the plant engineers committee in its latest form, as of April 1, 1950.

Several years ago, it became apparent from discussions with plant engineering personnel from the various GM divisions that too much trouble was being experienced with electrical and hydraulic systems incorporated in various machine tools and other production equipment, principally because of a serious lack of standardization of the components of these systems and the methods by which they were installed. Maintenance costs in some cases were found to be inordinately high, so serious consideration was launched on how to correct deficiencies. There were of course some published standards in existence, developed over the years by various trade associations. Thus, in the electrical field there are standards originating with the American Standards Association, the National Electrical Manufacturers Association (NEMA), the Resistance Welder Manufacturers Association and the American Society for Testing Materials. However, it was felt that these were in some cases obsolete and not as complete as the GM plant engineers would prefer to see.

Standardization by Joint Action—The problem seemed to be one of fast action—and joint action. By this was meant not only joint action between General Motors and other manufacturers, but also joint action between the companies supplying the various types of equipment using electrical and hydraulic systems, and trade associations in the field. Out of this type of thinking was born the Joint Industry Conference (JIC) technique of standards development, starting about 25 years ago in the standardization of motor frame sizes (NEMA).

As will be noted from the chart, part of the JIC activity is tied in with the plant engineers committee. This effort was concerned with electrical standards for industrial equipment and participating in their preparation, in addition to a joint automotive industry group, were the Industrial Electrical Engineering Society of Detroit, the Industrial Furnace Manufacturers Association, Mechanical Press Builders' Association, National Electrical Manufacturers Association, National Machine Tool Builders' Association and the Resistance Welder Manufacturers Association.

The standards first were published in September, 1948, and they applied not only to machine tools but also to presses, furnaces and heating devices, welders, forging machines, plating equipment, washers, foundry molding machines, portable tools including arc welders, abrasive blasting equipment, pumps and blowers, snag grinders, conveyors, woodworking machinery, industrial processing equipment, rolling equipment, die casting machines, plastic molding machines, and various other categories.

Standards Kept Brief—The electrical standards, as well as subsequent standards, are purposely kept brief. They are intended to provide detailed specifications for the application of electrical apparatus to industrial equipment which will promote safety of personnel, uninterrupted production and long life of the equipment. Note that these are "performance" factors, and not design factors. The standards are in no sense intended to limit or control development in the art of electrical or mechanical engineering. The following major subject headings are included in the standards: Diagrams, control, motors, wiring, grounding, electrical accessories and devices, and welding transformers.

There are numerous subheadings under each of the above sections, and each is given a prefix starting

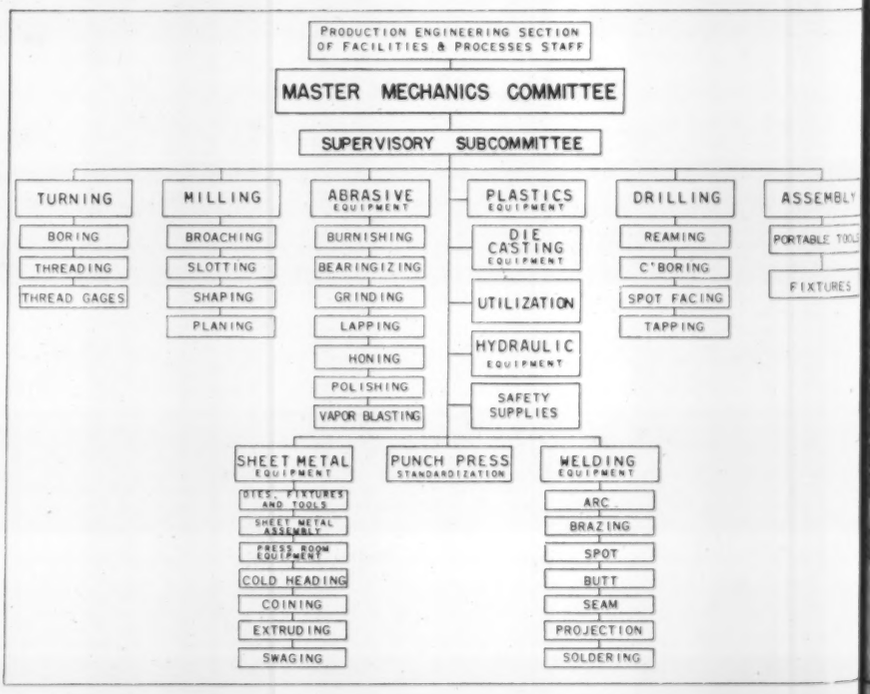

Fig. 3 — One of the most important groups pursuing standardization work, covering practically the complete range of manufacturing operations, is organized in this fashion

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with the letter "E" (for "electrical") and followed by numerals indicating the main section and subgroup. Thus under section 3 on motors, paragraph E3.3.4 reads as follows: "Motor compartments must be clean and dry and adequately vented direct to the exterior of the equipment and all openings must be of such height above the floor and be protected to such an extent that dirt, chips, etc., cannot enter at such times as the floor is swept or washed or the equipment is cleaned. Unless other compartments meet the requirements of the motor compartment, there shall be no openings of any kind between the motor compartment and any other compartment of the equipment. If a conduit or pipe is run into the motor compartment from any other compartment not meeting the motor compartment requirements, any clearance around the conduit or pipe must be sealed."

The electrical standards cover 20 pages. They are supplied to all GM divisions and to all suppliers requesting them. They may be reprinted providing no changes are made in context, and they are subject to constant revision as the JIC group which developed them may determine. Eventually they are included in the General Motors *Standards Book* issued by the equipment and operations group of the production engineering section.

Hydraulic Standards—Another standards activity was concerned with hydraulic standards for industrial equipment. First issued in September, 1948, and widely circulated and reprinted at that time, they came in for major revision last fall and were reissued in revised form in September. Participating in their preparation were the joint user group, leading hydraulic equipment manufacturers, hydraulic press manufacturers, National Machine Tool Builders' Association, Resistance Welder Manufacturers Association and manufacturers of tubing and fittings. Principal subheadings cover: Diagrams, hydraulic controls, pumps, piping, fittings and fluid passages, oil reservoirs, valves, accessories and devices, and safety. Included is a glossary of over 60 terms used in hydraulic specifications. The standards cover 41 pages. The September, 1949, edition of the standards notes 13 additions and 20 revisions from the standards issued a year previous.

A typical paragraph from the section on pumps, identified as H3.5.1, contains the following provisions on nameplates: "The following information shall be permanently indicated on each hydraulic pump—manufacturer's name and address; manufacturer's identifying part number and manufacturer's serial number if any. A data sheet or catalog providing complete information on speed limits, pressure range, delivery, horsepower required and viscosity range shall be provided with the specifications".

Pressroom Equipment—Still another standardization program dealt with pressroom equipment and in its initial phase the activity was concerned with further standardization work on mounting dimensions for mounting die sets, dies, etc., to the bolster plate and ram of a press. Three more programs in process are: Shot peening and cleaning; carbides; and welding transformers. All are following the successful joint industry conference technique.

Preliminary investigation of both General Motors divisions and other large users of presses in the automotive industry revealed a wide variation in size and spacing of tapped holes and T-slots in bolster plates and rams of presses for mounting dies, thereby restricting the possibility of interchanging dies between presses and consequently increasing costs. It was quickly recognized the problem was another for examination and discussion on an industry-wide basis, so a joint industry conference was activated and the group decided that standardization of mounting dimensions would be worthwhile since it would: 1. Provide interchangeability of dies between presses of the same size but of different make. 2. Permit quick interchangeability of dies between presses in the event of a breakdown. 3. Facilitate interchangeability of bolster plates and dies between divisions and between plants of a division. 4. Facilitate jig drilling of pressure pin holes, resulting in greater accuracy and better alignment of dies. 5. Minimize possibility of press breakdown due to use of pressure pins of incorrect size.

First phases of the standardization effort were devoted to double-crank single-action type of press.

(*Please turn to Page* 116)

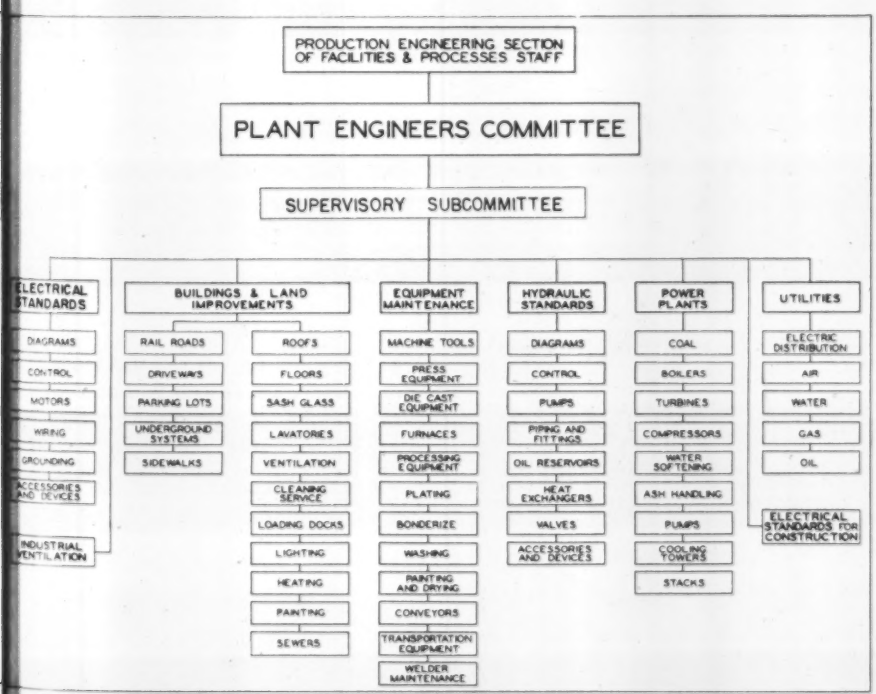

Fig. 4—Electrical and hydraulic standards for industrial equipment are the responsibility of working groups on this subcommittee, operating jointly with suppliers and trade associations

BLAST CLEANING

Cuts Fabrication Cost

Setup simplifies aluminum coating and bonding steel refrigerator components at Servel

MODERN abrasive blast cleaning techniques are making possible a new money-saving method of fabricating freezer shelf and coils of the 1950 model Servel refrigerators. By preparing surfaces properly, the steel coils can be coated with aluminum and at the same time metallically bonded to the aluminum shelf. The process is a step forward because heat transfer is improved—which means better refrigeration.

Because of the unique refrigeration principle employed by Servel, the freezer shelf coil must be steel. Since steel rusts, tubing on the bottom of the shelf must be protected by corrosion-resistant coating. In addition, shelves and coils (fabricated separately) must be joined together.

Three Operators Busy — A 14-foot LG Pangborn Rotoblast table is the machine used to prepare the coils for the aluminum coating and for cleaning and surface preparation of other small parts prior to assembly. The airless, centrifugal-type blast cleaning equipment processes the fabrications—some of which are extremely intricate—in two passes through the blast stream at a speed sufficient to keep three operators busy loading, unloading and turning the pieces. Evaporator coils, gas heat exchanger assemblies and other material to be blasted approach and leave the machine by automatic conveyor.

Air Blast Also Used—Not all jobs are suited to the automatic airless type cleaning. One operation in the assembly of gas refrigerators at the Evansville, Ind. plant is peculiarly adapted to airblast. This job involves coil units, already coated and welded together for final assembly. At the juncture of the welds it is necessary to blast clean the steel coil surfaces and to recoat these points with corrosion-resistant zinc applied by a heat processing method. This avoids the necessity of redipping the whole assembly.

To accomplish the job, the company uses a monorail conveyor type special Pangborn room which employs three standard AC-3 airblast units. The welded tubing is conveyed into the airblast room where it is "spot blasted" by three operators, each in an individual compartment with an individually controlled hose blast machine. Still moving, the blast cleaned tubing moves on through the room and out to the metallizing stage where zinc wire, acetylene and compressed air is used to "spot plate" where needed.

Depending on market conditions, Servel produces from 1000 to 1600 refrigerators a day, in addition to its other products (gas water heaters, gas air conditioning units and stoves).

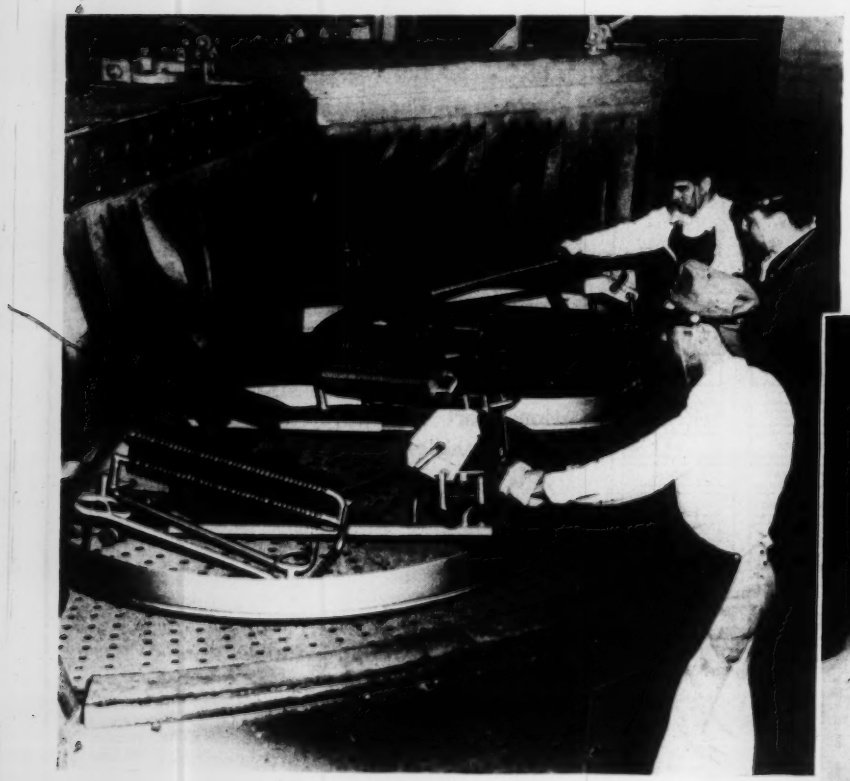

Fig. 1—A 14-foot Rotoblast table processes fabrications in two passes through the blast stream at a speed sufficient to keep three operators busy loading, unloading and turning the pieces

Fig. 2 — Refrigerator shelf coil is coated with aluminum and metallically bonded to the aluminum shelf

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STRICT PRODUCTION CONTROLS

Assure Precision-Manufacture of Welding Pipe Fittings

How material specifications, metallurgy, machining and welding operations are carefully controlled by a large fitting manufacturer so that the finished product will meet rigid installation and end use standards

By PHIL R. BECKER
Sales Manager
Welded Fittings Division
Midwest Piping & Supply Co. Inc.
St. Louis

TREMENDOUS expansion of such industries as oil refining, natural gas and chemicals in the past few years has required a multitude of materials, products and manufacturing methods. Common to all of these industries, and by no means a lesser product, are pipe fittings of the butt welding type. Made in conformance with many exacting production procedures, these fittings are for piping installations requiring resistance to high pressures, high temperatures, or highly corrosive substances.

In their design four factors must be considered: 1. They must be capable of serving at the design pressure and temperature allowed for comparable straight pipe; 2. metallurgically speaking, the fitting should have a close grained, homogeneous structure and good physical characteristics; 3. each fitting must be held to close tolerances and to conformity with published dimensions; 4. the line of fittings must be sufficiently flexible and adaptable so that the piping designer has a free range in planning the system.

Pressure in straight lengths of pipe is known to be equal at all points around the circumference, but this is not true of welding fittings. As soon as a straight tube changes its form or direction, there is definite change in stresses caused by internal pressure. In the case of an elbow, for example, there is a marked concentration of stress at the throat of the fitting, further increased by the fact that any 90 degree assembly has a tendency to open up or to straighten out in service. This stress concentration ranges from 25 to 43 per cent above that in straight pipe and is greatest in the smaller pipe sizes.

Additional Strength Needed—For this reason it is necessary to build additional strength into the welding elbow. This strength is obtained in three ways by Midwest Piping & Supply Co. Inc., St. Louis. First, a material having a 55,000 psi minimum tensile strength is used, as compared to 48,000 psi seamless pipe with which the fittings are commonly used. Second, a heavier plate than is necessary is used. The third way in which strength is added is in the production of the fitting. The forming process is so designed that all operations on the throat of the fitting are in compression; thus the plate, during the process of forming, is actually increased in thickness at the point of stress concentration.

In the process of manufacturing a 90-degree elbow, which may be considered a representative fitting, rectangular sheets of metal of the thickness required are charged into a heating furnace. As they come to forging heat, they are moved from the furnace to the first press, in which a hot punching operation is performed in order to cut the blanks to the correct shape. They move to the second press for forming the outer half of the elbow. A third press completes

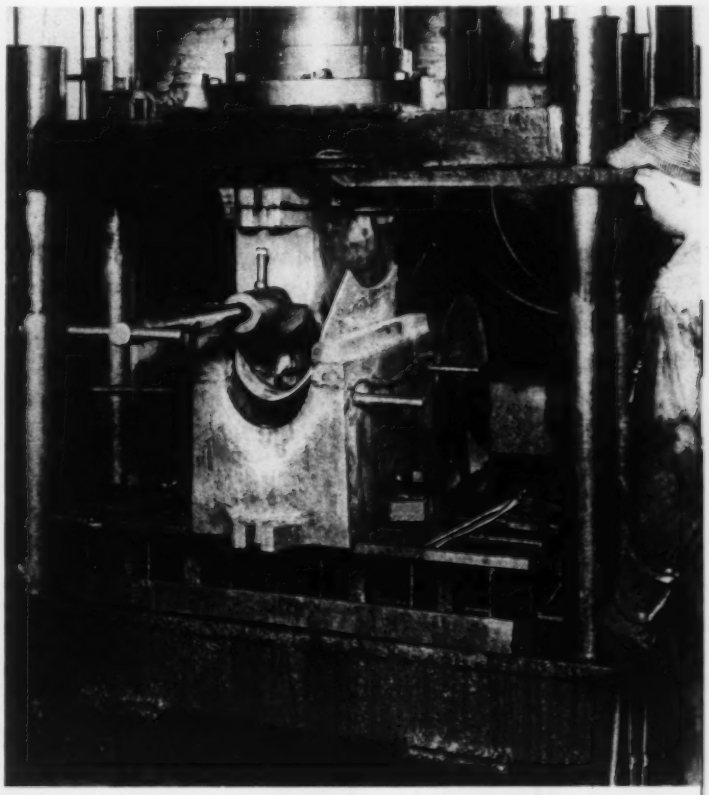


Fig. 1—Blank being U-formed on a 300-ton press. Plunger forces metal into die, forming the outer half of the elbow. In next press operation, edges of elbow are curved over to form the throat of fitting

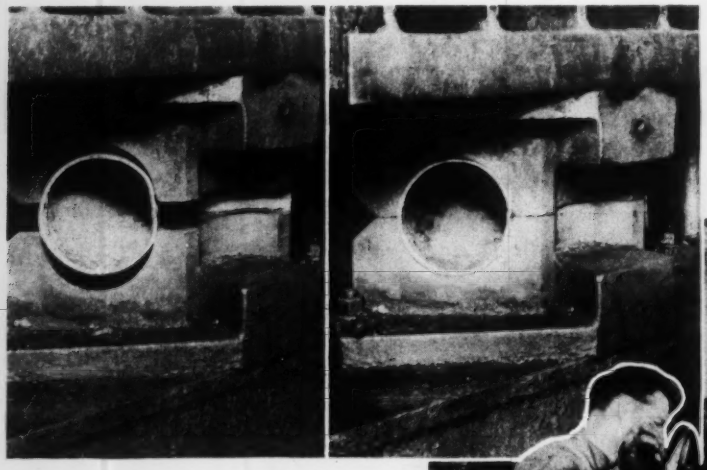
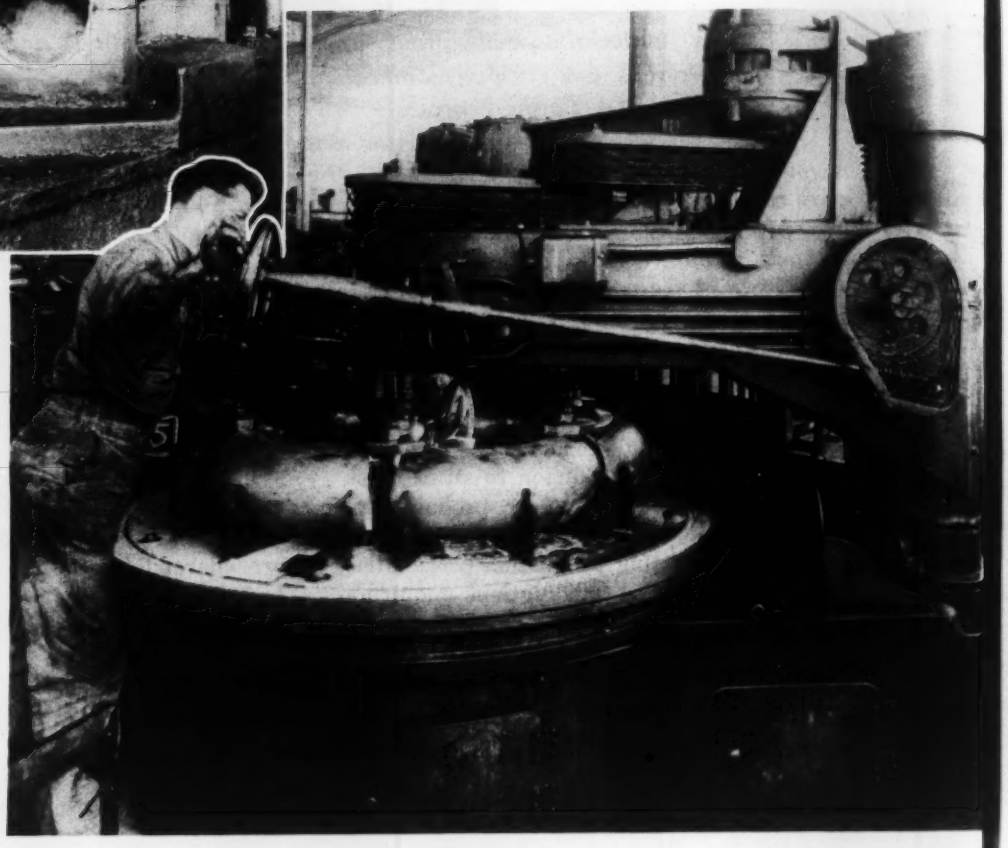


Fig. 2 (above)—Made oversize, this 8-inch elbow has been reheated and is being reduced to exact size and shape. At left, dies have started to reduce the 3/8-inch oversize circumference. At right, size-forging is completed with resulting true circular cross section, uniform wall thickness, and accurate radius, included arc and tangents

Fig. 3 (below)—Machine cutting groove for welding (see Fig. 4). Tool is stationary in center and table with fittings revolves



the operation by closing the throat of the fitting.

The properly shaped blank is being formed in Fig. 1. The plunger coming down from above folds the metal and forces it into the die, forming the outer half of the elbow. This U-shaped piece is then moved over into the final press in which the descending plunger catches the edges of the elbow and curves them over to form the throat of the fitting.

At time of original forming, the fitting is deliberately made slightly oversize. After welding operations, described later, the elbow proceeds to a final forming operation which compresses or sizes the fitting to its final accurate diameter. At the same time the fitting is "trued up" and its concentricity is established to very close tolerances. All forming operations are performed while the metal is hot.

Metallurgy—In order to obtain optimum physical properties in the finished fitting, working and heat treating temperatures are held to certain ranges, thus governing the action of the material through the various steps of manufacturing and also influencing the grain size, strength and ductility of the material in the completed product. Optical pyrometers are used to determine the temperature which will give the best results during the forming operations.

Generally, elbows can be formed with only a single heating operation; in the case of other fittings, such as tees and reducers, it is often necessary to reheat

Fig. 4—Sequence of welding operations for a 4-inch elbow. Other fitting sizes demand a similar operational sequence

the metal after the first or second forming operation in order that the final pressing be performed at the proper temperature.

For good metallurgical qualities the forming and welding operations must be followed by a final heating operation to stress relieve each fitting. Actually, this final heating operation is carried out at a temperature and in such a manner that the fittings are completely normalized rather than merely stress relieved. Like the heating furnace, the stress relieving furnace is also controlled by an optical pyrometer.

Red-hot fittings are allowed to cool slowly after the sizing operation. In this manner locked-up stresses are relieved and the heat affected zone

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resulting from welding is normalized. More intricate heat treatments, when necessary, are performed in a considerably larger furnace, capable of holding a full carload of welding fittings or fabricated piping. In such a furnace, controlled by six thermocouples attached to recording devices, welding fittings formed from such alloys as 4-6 per cent chromium, ½ per cent molybdenum, and other higher alloy material are annealed. In many cases, the heating cycles for such annealing operations must be carried out over a period of more than 24 hours with temperature increases or decreases as small as 50° F per hour.

No Flow Noted—Flow of metal during forming operations is also an important metallurgical consideration. In order to demonstrate what actually happens to the plate as it goes through production and emerges as a finished fitting, blanks were punched-marked in ¾-inch squares. Upon completion of the entire production process along with a regular run of fittings, it was noted that at no point was there a "flow" of metal from one section of the fitting to another section in order to increase or decrease the wall thickness. The only squares undergoing a significant change in their original size and shape were in the throat of the fitting where they were somewhat smaller than before processing. This is accomplished, as stated previously, through compression in forming and final sizing operations.

In preparation for welding through the throat of the elbow, the fitting is grooved on a machine (Fig. 3) which cuts through to the full depth of the parent metal. The sequence of this and following steps in the machining and welding is shown in Fig. 4. Beginning on the outside of the fitting, welding beads are laid one over another until the groove is entirely filled and an overlay of at least 1/16-inch in depth is deposited.

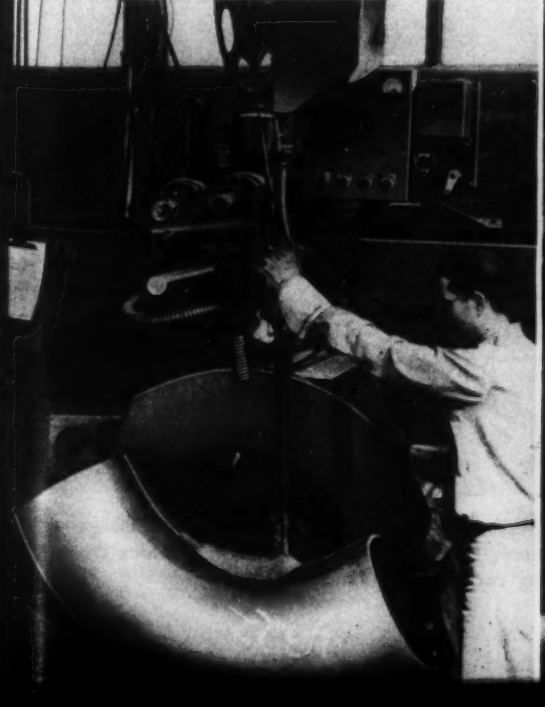
Still referring to Fig. 4, a welding bead is laid on the inside of the fitting so that there is a double weld from inside and outside. This is followed by removal of the excess metal from the inside bead of the fitting, leaving the interior of the elbow perfectly round and smooth. Procedures vary for other sizes and types of fittings, but are essentially the same and follow the general pattern of the 4-inch elbow.

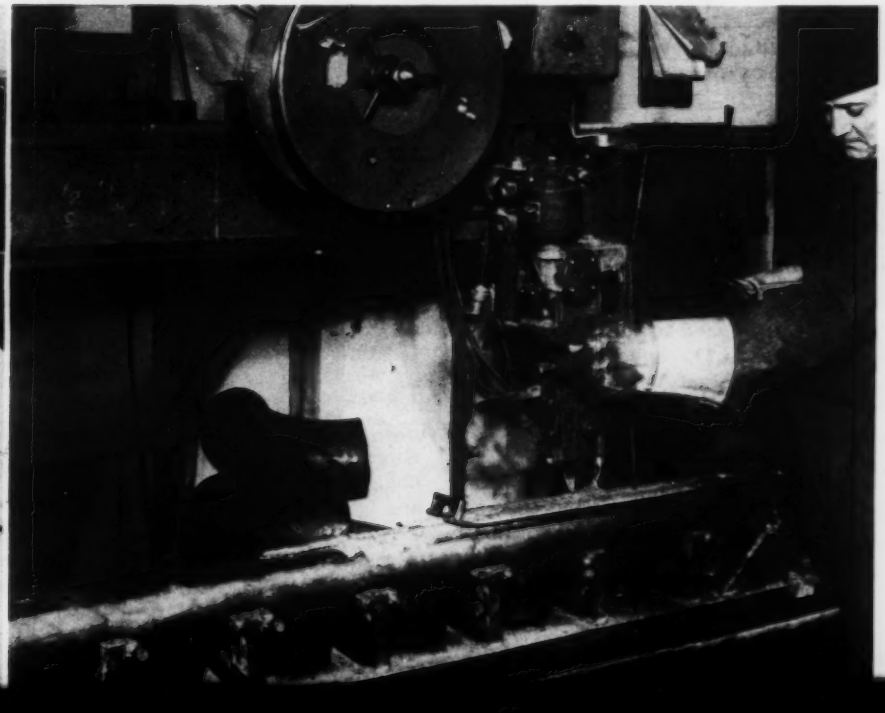
Cutting the channel for the weld is performed by mounting the fittings on the grooving machine turntable, so that the cutting is performed as the elbow revolves past the cutting tool. A head which projects over into the inside of this "doughnut" arrangement carries the cutting tool, as shown in Fig. 3. A hydraulic arm forces the tool up against the throat of the setting. As each finished fitting comes from the cutting tool to the operator, he removes it and places a new fitting in position to be carried around past the cutting tool.

Welding Most Important—More importance is attached to the method of welding than to the method of grooving the fitting. Fig. 5 shows a typical machine used in the automatic process of welding a large elbow. In this particular machine, the welding wire is carried at the top of the machine on a spool and is fed down through a narrow channel to the groove in the elbow. The wire is not coated; welding is shielded by a loose, granular flux which moves from the square reservoir down through the large tube

Fig. 5 (below left)—Submerged-arc welding machine used in automatically processing large elbows. Note loose, granular flux on elbow. Fitting has tangents at each end

Fig. 6 (below)—On this welding machine, tees are mounted on a dolly, with outlets down. All are welded at one time, later to be cut apart. As on all welding operations, this one is completely automatic; operator cannot control weld quality once the machine is set and welding started





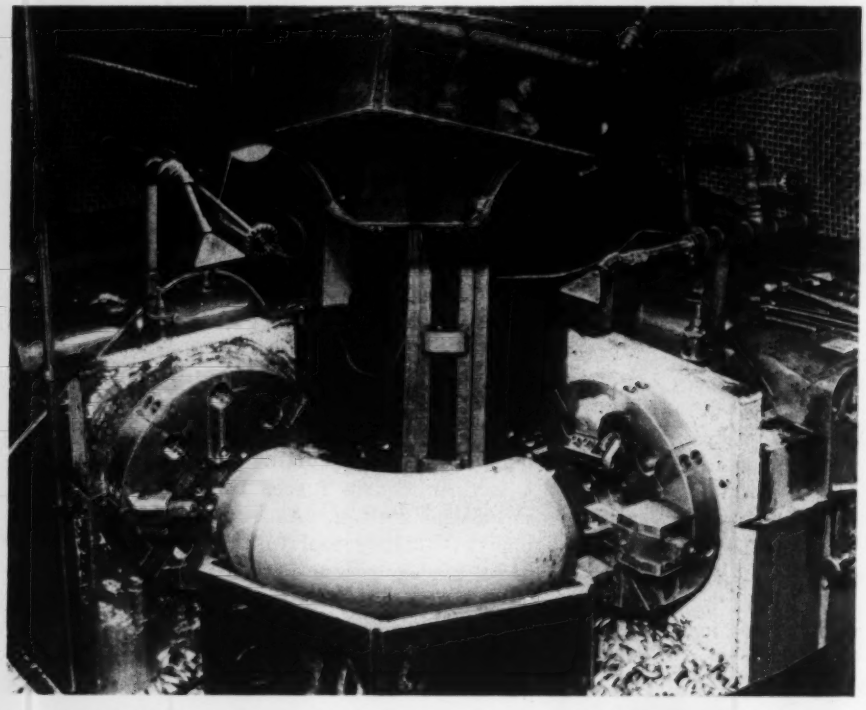


Fig. 7—Special lathes with two hydraulic heads simultaneously machine-bevel both ends of 90 degree elbows. Center-to-end dimension is automatically controlled

to the fitting, where it spreads out so as to completely enclose the weld during the operation.

At no time does the machine operator exercise any control over the quality of the weld. The amperage and voltage are predetermined and preset and the length of arc, the speed of travel and the control of the welding rod itself is automatic.

Five duties are performed by the operator in connection with this job: First, he presses a button to drop the entire apparatus down into position over the fitting; second, he starts the weld by pressing another button and stands by until the machine has completed the weld; third, he stops the machine by another button; fourth, he presses a fourth button to lift the entire apparatus away from the fitting; and fifth, he opens and closes the valve which permits the flux to flood the weld.

Machine shown in Fig. 5 is operating on a fitting having tangents, or straight sections, on each end. When mounted originally in the machine, it is positioned to the right of the welding head. The apparatus is then lowered to contact the fitting, and the starting button touched. The machine then takes over, the head traveling along the channel beam until the tangent section is completed. The movement of the head then stops and the turning device shown in the background automatically begins to rotate the elbow beneath the head until the curved section is completely welded. At this point the turning machine automatically stops and the head picks up its motion again to complete the welding of the fitting by running over the tangent section at the other end of the elbow.

Welding Wire Reversed — The means used to apply the inside bead to a welding elbow makes use of a machine on which the welding wire is reversed. The spool is carried at the bottom of the machine and the wire travels upward through a curved conduit to its terminal at the weld groove. Flux is carried at the end of the conduit in a small hopper which is replenished after each fitting has been completed. The turning device rotates the elbow so that conduit and hopper in effect pass along the inside of the welding groove.

The same type of machine is used for the welding of tees. As shown in Fig. 6, the tees are mounted on a dolly with the outlets pointing downward. The welding machine then travels along the fitting so as to weld an entire string of tees at one time. They are later cut apart and are then ready for the next operation.

Welding procedures used have been subjected to tests over a long period of time, but, as is the case in all automatic devices, the submerged arc welding machine must be correctly set in the beginning of its operation in order to perform properly. To insure that this is the case, the first few fittings from each production run are radiographed.

Four at Once—The x-ray technique is generally used by the company for this purpose. In the case of elbows, four are taken from an order to the radiography laboratory from the welding machine. There the fittings are set up and marked for identification, film strips are placed on the inside of the weld and the fittings are x-rayed. After a suitable exposure the film is developed and inspected.

As long as all of the test fittings are found to be without defect, welding is continued on that particular order. As the production run prog-

Fig. 8—View from another angle of special lathe for machining a 20-inch elbow. Hydraulic ram in center foreground clamps fixture in place over fitting, assuring correct machining of angles

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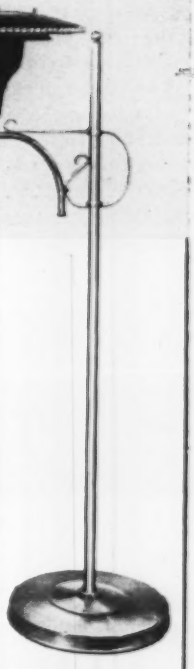

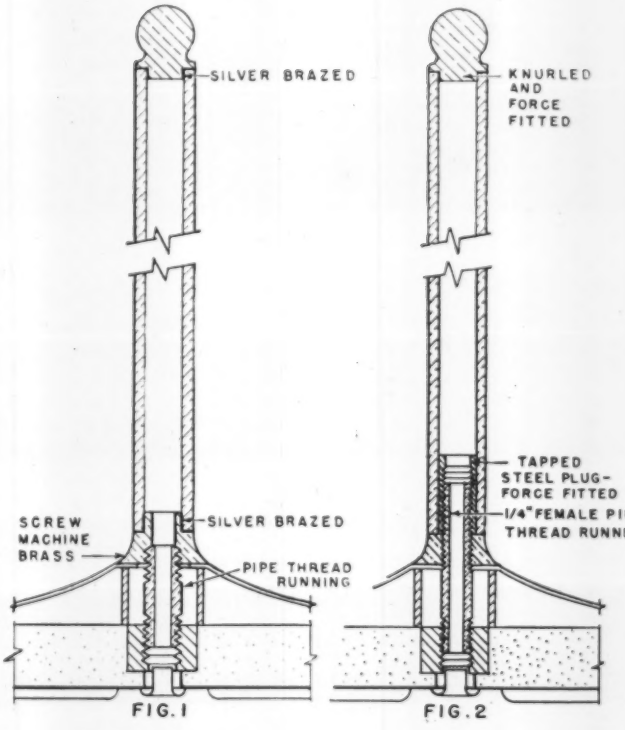

HERE'S HOW IT WAS DONE

Fig. 1 shows the two spots that formerly were silver brazed, and the screw machine brass piece that joined the stem with the base. Fig. 2 shows how top knob and machined brass section that joins the stem with the base are force fitted, eliminating 2 brazing and finishing operations, thus strengthening the lamp and making possible faster assembly and disassembly. Fig. 3 shows base construction simplified even further . . . single screw machine part in the base does the work of three separate parts.

Lamp stem is Revere ¾" O.D. x .680"—.6835" I.D. 70-30 brass tube hard drawn. Support bracket is ⅛" x 1¼" Revere Brass Strip while the outside floor base spun shell is made from 12" wide x .0253 Revere Brass. Screw machine parts at top and base of lamp are Revere 240 type screw machine rod.

Joint efforts of Revere and Plainville Metal Works resulted in elimination of 2 silver brazing and finishing operations . . . faster assembly.

IN working with manufacturers on their various problems, Revere not only takes into consideration how its products can be used to help solve these problems, it also delves into the production methods employed. As a result there have been many cases where Revere and the manufacturer have collaborated to work out new production methods that have not only produced a better product but have also cut production costs.

Newest example of this is the manner in which Revere collaborated with the Plainville Metal Works, Plainville, Conn., in developing the Sight-Light patented reading lamp which they manufacture for the Sight-Light Corp., Deep River, Conn. Originally the knob at the top of the lamp stem was silver-brazed in. Revere suggested this could be a force fit.

Formerly, there had been a screw-machine brass trim section at the base of the lamp stem which had a shoulder on it that was also silver-brazed into the tube. A ¼" running pipe thread nipple with an unthreaded section anchored this screw machine part to the weighted base which was covered by a spun brass disc.

The engineers at the Plainville Metal Works tried various ideas to improve this construction. The final result was a machined section of solid brass that is joined to the lamp stem with a force fit, while the opposite end of this section is threaded for fastening to the base.

Results: 1. Elimination of two silver brazes. **2.** Elimination of two finishing operations, one of which was acid cleaning, and the other, the removal by hand of the discoloration caused by the acid cleaning. **3.** Subassemblies turned out 3 times as fast through a new, faster assembly method that permits finishing before assembly on a mass production basis instead of by hand. **4.** A substantially stronger lamp. **5.** A trim, one-piece screw-machine part at the base that is turned out faster and in a single machine set-up.

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resses sample fittings are removed at intervals and radiographed to make sure that the machine does not deviate from its original condition.

The third design factor concerns the accuracy of the fittings, which must be held to close tolerances and to conformity with published dimensions. Concentricity is achieved by the sizing process in which the fittings are actually brought down by compression to the correct outside diameter and to true tubular shape. The machining of the end is important in the accuracy of the bevel and of the land or straight section at the inside of the wall; also for the accuracy of the taper-bore on the inside of each end of the fitting.

Another consideration of importance is the center-to-end dimension of the fitting. This must be held to very close tolerances, for in many cases welded piping systems are prefabricated and the pipe is cut to dimensions indicated on the blue-print. If the elbow then fails to measure up to true dimensions, the fabricated section cannot be assembled without recutting the pipe. One other consideration in the accuracy of the fitting concerns the plane of the bend. This must be perfectly perpendicular to the measured ends. The squaring table is used to check the fittings for this factor.

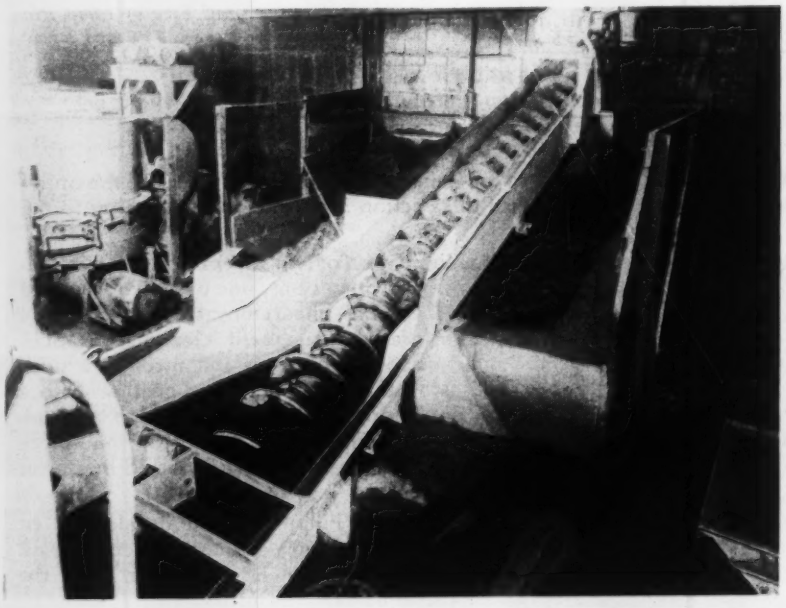
In order to provide the high degree of fitting accuracy required, Midwest has designed and built its own lathe equipment. Fig. 7 shows an elbow in a "two-way" lathe, in which both ends of the fittings are machined simultaneously. After the fitting is placed in the bottom half of the chuck, a hydraulic ram is used to bring the upper portion of the clamping device into position on the fitting, completely enclosing it at each end. The center of the fitting is supported in the bottom chuck and is pinned down by the tongue which may be seen projecting from the upper half of the chuck. In this way, the plane of the fitting is held perfectly true with respect to the machined ends.

Heads Revolve Simultaneously — After the elbow has been clamped, the two heads, fitted with cutting tools, begin to revolve simultaneously. They operate on hydraulic shafts which permit them to move forward and engage the edge of the fitting. Since the shafts are set with automatic stops, a perfectly true center-to-end dimension is achieved. Similarly, since both heads operate simultaneously, an absolutely correct 90 degree included angle is assured. The cutting tools in the revolving chuck perform three operations simultaneously: Forming of the land, machining of the bevel and taper boring of the inside of the fitting. Fig. 8 is view from another angle of a lathe set up for machining 20-inch elbows.

This same method is used for the machining of welding tees, save that the lathe is equipped with three hydraulic heads. These machines are extremely flexible. Bed of the lathe is fitted with slots so that the heads may be moved about and their number is increased or decreased to permit machining of 90 and 45 degree ells, tees, reducers, or caps on the same machine.

Welding fittings must be designed in keeping with the fourth factor, too—that of offering sufficient flexibility to allow the piping engineer free range in planning the system. Although the art of welding in itself offers a great degree of flexibility in fabrication a broad variety of fittings is also necessary to meet varying conditions. For example, in the case of elbows (which form at least 50 per cent of the average fitting installation) two different types with varying radii are available to cope with space and flow problems. Certain elbows are made with a tangent, or straight section, on each end to promote flexibility and simplify installation, and the reducing elbow is fast replacing more cumbersome designs.

In similar manner, a wide range of materials is necessary. Fittings made from two grades of carbon steel and from wrought iron are basic. But increasingly severe temperature, pressure and corrosion conditions have led to a growing demand for fittings of stainless steel, of high yield strength metals, and of carbon or chromium-nickel alloys. Nickel, aluminum, Monel and other metals are increasing in use in welded piping systems. The widening list of metals presents new problems daily—problems which are being met by careful research and experiment.



WASHING MACHINE FOR SAND: After cleaning castings and removing their sand cores by a Hydro-Blast system, Advance Foundry Co., Dayton, O., separates extraneous matter from the core sand by a screw type washer. Sand is delivered to storage bin in a clean and dewatered condition, ready for use. Made by Eagle Iron Works, Des Moines, Iowa, the washer breaks up and disintegrates the baked cores which often break out in lumps. After removal by the blasting system, a product of Hydro-Blast Corp., Chicago, the sand flows through a floor grate and into the long weir washer-classifier dehydrator

Family Resemblance

NEWLY designed packages for Red Tang files made by Simonds Saw & Steel Co., Fitchburg, Mass., are red in color, resembling other similarly-colored packaged products made by the company. Having special top and end labels, the shop and saw sharpening files are said to be easier identified in the new package.

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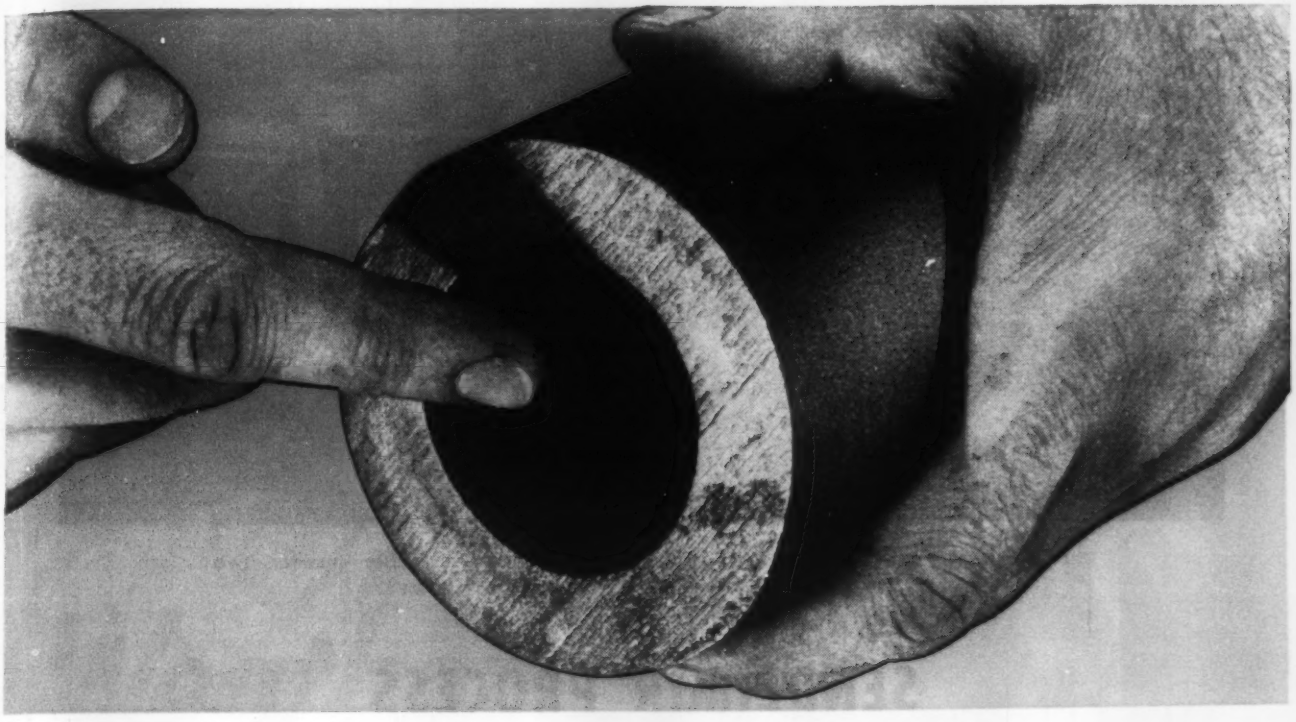

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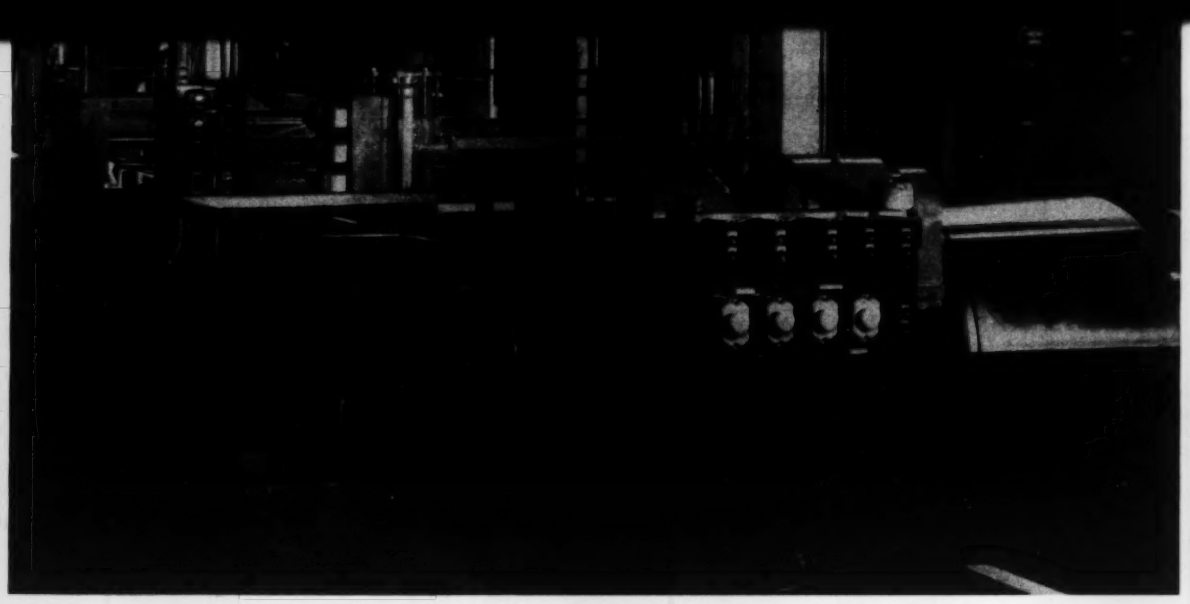

Fig. 1—Entry end of continuous galvanizing line showing double uncoiler, two sets of pinch rolls, shear, welder and loop car

SENDZIMIR PROCESS
Broadens Galvanized Sheet Applications

Surface preparation, base metal temperature and zinc bath composition controlled with high degree of precision under continuous operating conditions. Process turns out products that can be spun, formed and drawn severely without loss of coating

By K. OGANOWSKI
Associate Director, Research Laboratories
Armco Steel Corp.
Middletown, O.

SENDZIMIR coating process used by Armco Steel Corp. is a radical departure from conventional sheet galvanizing practice.

Operation-wise, the continuous method specifies a set of conditions under which principal requirements of the coating procedure — surface preparation, temperature control, spelter composition—are readily met and consistently controlled.

Production-wise, it broadens application of galvanized sheets and coils. Adherence of the coating produced by the process is sufficient to withstand drawing and forming operations to the drawing limit ability of the base metal without peeling. It also is giving metal fabricators a sheet steel that offers better rust protection to users of their products.

Four Lines in Operation—Although the process is now available to other steel companies under license, all galvanized tonnage produced today by the method is coming from Armco plants. So far the corporation is operating four lines, the Middletown, O., installation being the newest. First licensee is Inland Steel Co.

Mechanical equipment for the Middletown continuous coating line was furnished by Aetna-Standard. Electric Furnace Co. supplied the furnaces involved.

Initial unit, based on the Sendzimir coating process, was installed at Butler, Pa., by Armco back in 1936. Much of the development in continuous zinc coating which has revolutionized a good portion of the galvanizing industry stems from this unit.

Main Process Features—Main features of the process consist of heating and cooling the base metal, maintaining certain prescribed atmospheres at designated points, and immersing in the alloyed zinc bath at a suitable temperature. Such process-

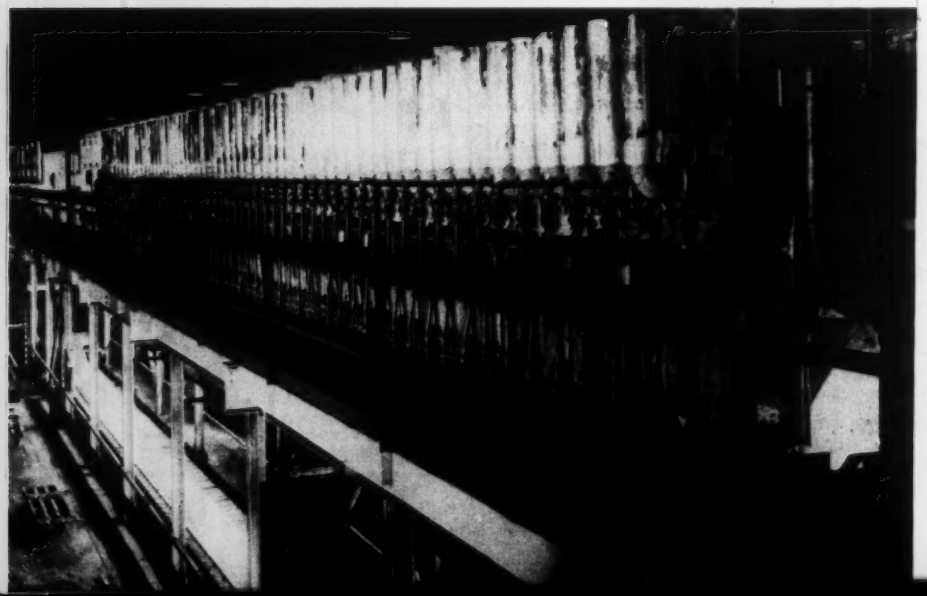

Fig. 2 — Reducing and cooling furnaces. Beneath furnace balcony in foreground is the entry end loop car

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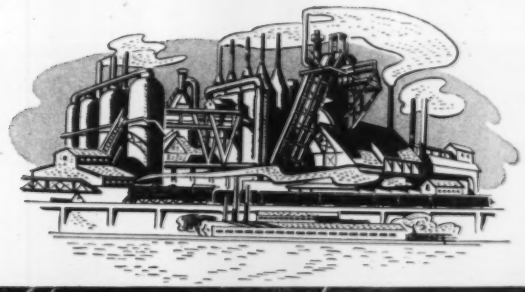

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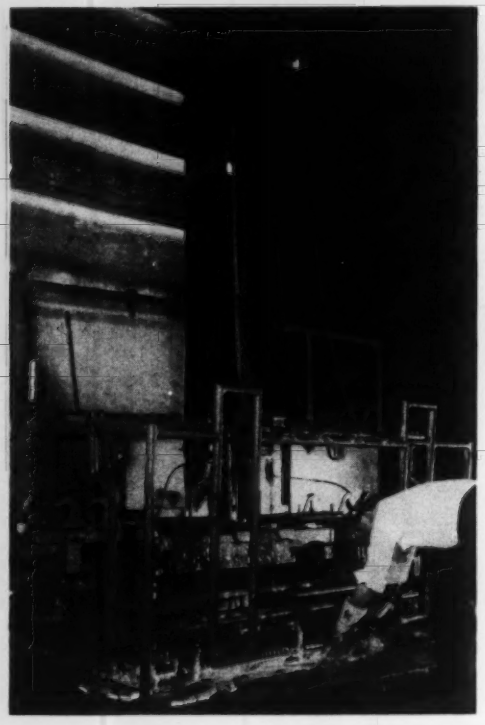

Fig. 3—Adding zinc to zinc pot. Structure at left is exit end of cooling furnace

ing steps can be balanced easily and controlled with a high degree of precision under continuous operating conditions. All components of the coating equipment are arranged so a continuous flow of material through the unit can be maintained consistently.

If the equipment permits sustained operations at a scheduled rate of speed without stops or slowdowns, an amazingly uniform product quality can be obtained.

Limitations of Process—Because of handling problems, it is not readily adaptable for coating cut length sheets and formed articles. Neither is it satisfactory for coating highly alloyed materials containing large amounts of elements, such as chromium, which have oxides difficult to reduce. Severely-scaled steel, or surfaces carrying compounds that are not combustible or volatile at oxidizing temperatures, such as some wiredrawing lubricants, cannot be coated without additional pretreatments.

Surface Prepared in Two Steps—In the Sendzimir process surface preparation of the base metal is accomplished in two steps: Oxidation of the surface, and subsequent reduction of this oxidized surface. The surface can be oxidized either by heating in an oxidizing medium or by other chemical means.

When oxidation by heat is used, it is possible to remove rolling lubricants and other combustible material. At the same time it provides a surface having the same degree of oxidation regardless of variations in the cleanliness of the surface of the metal upon its arrival at the coating unit.

Such uniform surface preparation is possible because products of the reaction, which removes surface contamination during the heating operation, are gaseous and the degree of oxidation is obtained by only one readily controllable factor—temperature.

An alternative means of oxidation employs chemical methods. An alkaline cleaner removes rolling oils and is followed by rinsing and drying to secure oxidation of the surface.

Reaction Products Gaseous—In the reduction of the oxidized surface, the reaction products are gaseous and the quality of the reducing operation is controlled by composition of the atmosphere and the temperature in the furnace. Stable operation and reproducible results are obtained consistently in the reduction operation. This is because variations in the condition of the metal surface were eliminated in the previous oxidizing step. A certain degree of desulphurization and decarburization of the surface also occurs during the reducing operation.

Surface Annealed While Reduced—Economy dictates combining of surface preparation steps with heat treatment of the base metal. Therefore, the full-hard, cold-reduced material is annealed at the same time the oxidized surface is being reduced. Any heating and cooling cycle, practicable for a continuous annealing operation, can be employed in this process. However the metal when immersed in the zinc bath must be at a temperature which will allow instantaneous wetting and bonding with the zinc.

Control of the base metal temperature at the time of immersion in the bath fulfills the second requirement necessary for a successful coating operation.

Controlling the temperature of the metal during oxidation, reduction, annealing and cooling is not difficult with properly engineered equipment. Maintaining proper atmospheric conditions throughout the furnace for reduction of the oxidized surface and prevention of reoxidation in the cooling section, is also not difficult. Practically it requires only maintenance

RECEIVES RECOGNITION

For his contributions to the art of galvanizing, Tadeusz Sendzimir, right, receives first annual award of the Galvanizers' Committee from J. L. Schueler, chairman, annual award committee. Presentation was made at the American Zinc Institute-sponsored semiannual Galvanizers' Committee meeting, Toronto, Canada, May 18 and 19. Patents covering the process, detailed in the accompanying article, were granted to Mr. Sendzimir in 1938 and 1940, and are controlled by Armco. Author Oganowski worked with Mr. Sendzimir in developing, improving and perfecting the process.

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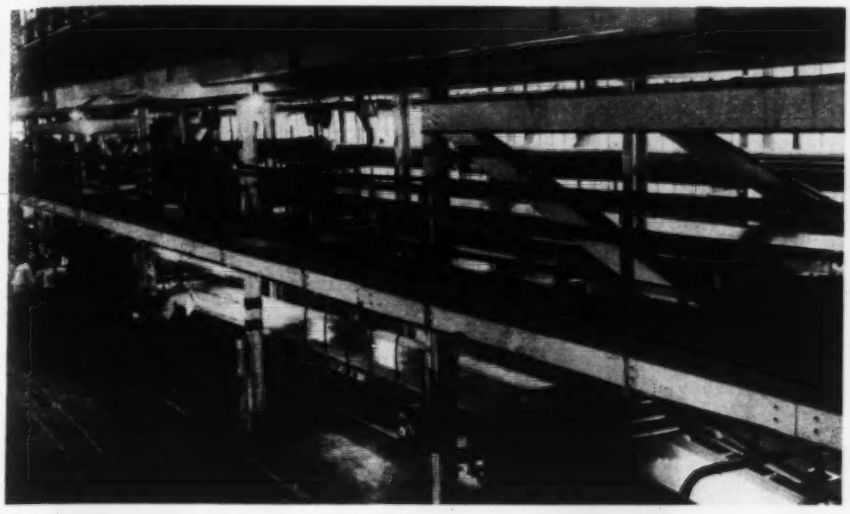

Fig. 4—Receiving end equipment is located at floor level. Shown are the shear, roller leveler, inspection table and oiler

of the quality and flow of a suitable reducing gas.

Bonding Is Instantaneous — When the metal surface is properly prepared and the metal temperature is correct, wetting and bonding with zinc occurs instantaneously, and a rapid reaction between the zinc and the base metal takes place. This reaction, unless suppressed, would result in the formation of brittle iron-zinc compounds in the coating. They would occur even with the shortest practicable immersion times, and presence of these alloys would be detrimental to the ductility of the coating.

The rate of formation of iron-zinc alloys in the coating is controlled by addition of aluminum to the zinc bath and by temperature of the material being coated.

Aluminum Content Readily Controlled—The aluminum content of the bath can be readily controlled because, with the method of surface preparation used, no flux is necessary. In ordinary galvanizing processes, desired amount of aluminum cannot be retained in the zinc bath due to the rapid reaction of aluminum with the flux. Consequently, the third major requirement of the coating operation, suitable bath composition, is fulfilled and a ductile, adherent coating is obtained.

Strip Uncoiled and Fed — Equipment on the feeding end, Fig. 1, must uncoil incoming strip and feed it into the coating line at a designated constant speed under specified tension. It also must allow for joining of the coils without affecting the speed of the unit. Generally, this equipment consists of one or two payoff reels, auxiliary pinch rolls which manipulate the ends of the two coils during the joining operation, a shear, a welding unit, a looper, a tension device, and main feeding pinch rolls.

The looping device must be of a sufficient capacity to permit all steps of the coil joining operation to be performed when the unit is operating at its greatest speed. The tension device must regulate the tension of the strip in the furnace according to variation in thickness and width of the strip. The tension must be sufficient to guide the strip through the various components of the complete coating unit but not so great as to stretch or break the strip in the furnace.

Uniform Preheating Required—The preheating furnace must preheat the strip uniformly to a designated temperature. The furnace capacity must be sufficient to heat the widest strip to be coated. It is desirable to equip the furnace with an adjustable firing pattern so that uniform oxidation over the width of the strip can be obtained for all widths.

A wide variety of industrial furnaces of a suitable construction is satisfactory. The choice of heat source depends on economical considerations. High temperature, direct-firing gas burners are found to be well suited for this furnace, because they give maximum energy release per unit hearth area.

The annealing furnace, Fig. 2, placed in line with the preheating furnace, must complete heating the strip under a reducing atmosphere to the annealing temperature. The heating capacity of this furnace should be sufficient to attain the maximum specified temperature at the maximum rate of production.

The need for closely controlled atmosphere composition makes necessary specially designed furnace elements such as the entry door, shell, brickwork, and hearth conveyor. Open-flame burners should not be used in this furnace. Gas-fired radiant tubes or electric elements, driven hearth rolls of a suitable alloy and with properly sealed bearings, and automatic controls are typical features of the annealing furnace.

Sealed by Molten Zinc—The cooling furnace is directly connected to the annealing furnace and extends to the zinc bath with its end sealed by molten zinc. The purpose of this furnace is to control the rate of cooling of the strip, in a nonoxidizing atmosphere, according to the requirements of any particular annealing cycle or cycles for which the coating line is designed.

Since the rate of production is variable with the width of the strip, the quantity of heat to be dissipated is also variable. The cooling furnace must compensate for these differences so the temperature of the strip on entering the zinc bath is essentially constant regardless of the width of strip. Consequently, the cooling furnace is equipped with automatically controlled heating and cooling means.

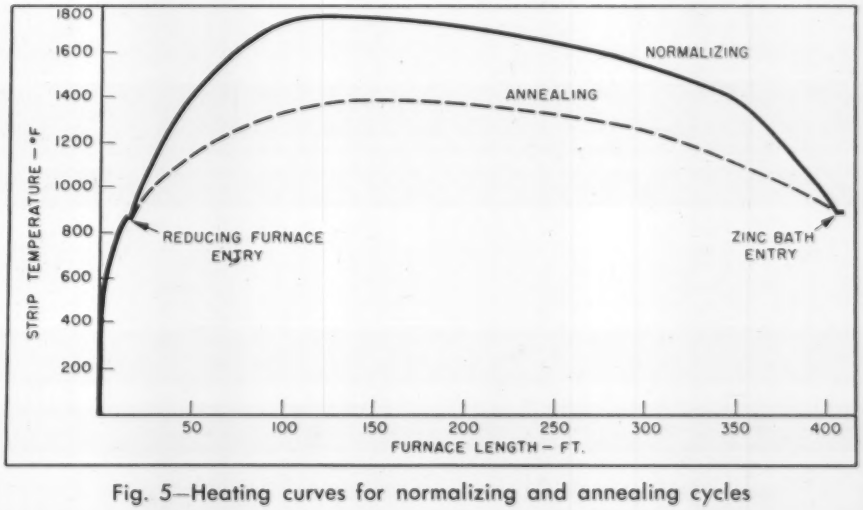

Fig. 5—Heating curves for normalizing and annealing cycles

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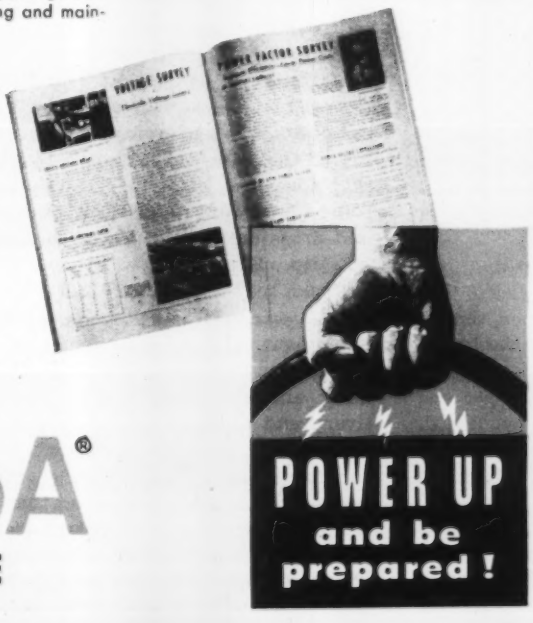

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Any air infiltration in the final section of the cooling furnace would reoxidize the strip and spoil its wetting characteristics. Therefore special precautions must be taken in the design and construction of this section to avoid this hazard. Complete elimination of hearth roll out-board bearings in the final part of the cooling furnace is found to be mandatory.

The pot furnace, which surrounds the zinc bath, must supply heat for initial melting of the zinc and also heat for maintenance of a uniform zinc temperature during normal operating conditions. An electrically-heated pot furnace serves most satisfactorily in this application.

Heat Supplied by the Strip—Under operating conditions essentially all of the heat required for heating and melting of the zinc and for radiation losses is supplied by the incoming strip. Only a small amount of the heat necessary to balance the zinc bath temperature is derived from the pot furnace.

The inherent uniformity of heating and the low investment cost of an electric furnace compensate for the small increase in cost of heating by electricity as compared to gas. As this process does not require heating the strip in the bath or any specified time of immersion for wetting and bonding, the size of the pot, Fig. 3, can be small. It must, however, contain strip-guiding and finishing equipment and also must have space for accumulation of dross. With adequate pots, drossing is necessary only every 10 to 12 weeks.

Dross Formation Slow—The slow rate of dross formation in this process allows the use of a zinc pot with a capacity of only 5 to 7 tons of zinc per average rated ton of hourly capacity.

The amount of dross formed in a given time in this process, which does not require the use of flux and in which the temperature of the strip is closely controlled at the point of immersion, depends primarily on the length of travel through the zinc. The influence of speed or amount of metal moving through the pot is rather insignificant.

Two important relationships are derived from the preceding facts: The amount of dross formed per ton of coated product is smaller if the travel through the zinc bath is shorter, and the amount of dross formed per ton of coated product for a given length of the travel is smaller if the amount of material passing through it is larger.

Pot Life Increased—Since aluminum is present in the molten spelter and only low rate of heat transfer through the pot walls is required in-

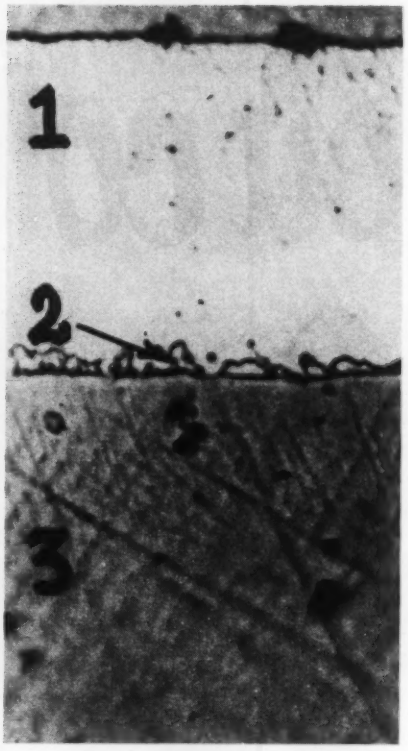

Fig. 6—Microstructure of Zinc-grip coating showing (1) zinc coating, (2) zinc-iron alloy, and (3 base metal

got iron or fire box steel offers a greatly increased pot life in this service as compared with ordinary galvanizing operations.

A submerged idling roll is generally used for guiding the strip through the zinc bath. A suitable scraping device prevents excessive and non-uniform buildup of iron-zinc alloy on the surface of this roll, and, as a result, no redressing is required during the entire operating period between drossings.

Exit rolls, common to the sheet galvanizing operation, serve as a means of regulating the weight and uniformity of the coating. No flux is required on the surface of the bath to maintain a bright and uniform coating on the rolls. A mechanical scraping device is attached to the exit rolls to prevent deposition of oxide and dross on the surface of the coated strip. Service life of the exit rolls between redressings is 10 to 12 days.

The essential components of this equipment, Fig. 4, are typical of all continuous strip processing lines handling annealed steel strip. The delivery end of this type coating operation must provide: Sufficient time for formation of the spangle; rapid cooling of the coated strip so that no flexing or bending of the strip occurs at high temperatures; absence of sharp or reverse bends in the pass line of the strip to avoid the hazard of coil breaks; and sufficient looping devices to avoid interruptions in the constant coating speed.

Pinch Rolls Govern Line Speed—The main set of pinch rolls, which establishes the coating speed of the line, pulls the strip through the furnaces and pot equipment. It is installed far enough from the pot to avoid damaging the coating or base metal. The speed of this set is changed with the changes in the gage of the strip. All other drives on the line are either synchronized with the main pinch rolls or separated from it by looping devices. This provides that all stops, slowdowns, and speed-ups required by the coil changing manipulation on the feeding and delivery ends can be performed without affecting the speed of the main pinch rolls.

Roller leveling, oiling, rejection separation, stenciling, coiling, and shearing equipment are generally incorporated in the unit. Consequently most of the coated material is ready to ship as it leaves the coating line. Temper rolling, slitting, and Bonderizing which can be carried out at constant high speeds regardless of the thickness of the strip are generally separate operations.

Dissociated anhydrous ammonia (75 per cent hydrogen-25 per cent nitrogen by volume) serves as a reducing atmosphere in annealing furnace and as a nonoxidizing atmosphere in the cooling furnace. A liquid ammonia storage tank with a holding capacity of one to two carloads and an ammonia dissociator with a capacity of 1000 to 2000 cubic feet of dissociated gas per hour are adequate to supply the atmosphere needs. The required capacity of the ammonia dissociator depends largely on the width of the unit and the method of sealing the entry to the reducing furnace.

Operation—It is not practical to start this type of process slowly or operate at reduced speed while the operators are acquiring the necessary training and the equipment is being synchronized. Proper rates of heating and cooling and the desired balance of temperatures throughout the processing equipment cannot be obtained at reduced speeds and inferior quality product is produced.

A better procedure is to synchronize the equipment and familiarize the men with their functions while running the equipment without heat in the furnaces or molten zinc in the pot.

After training the crew and adjusting the equipment, zinc is melted in the pot, the furnaces are preheated and the atmosphere is in-

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Base Metal	Yield Strength Lbs./Sq.In.	Tensile Strength Lbs./Sq.In.	% Elongation in 2 inches	Rockwell Hardness B-Scale
Ingot Iron	35,000-45,000	50,000-59,000	20-27	55-70
Copper Steel ...	40,000-45,000	52,000-57,000	23-30	58-68
Mild Steel	37,000-45,000	52,000-57,000	25-30	58-65

troduced in the cooling and reducing furnaces. Then the unit is threaded, temperature settings adjusted, and operations started at full rated speed. The same procedure is employed after drossing or complete shutdowns.

Line Speed Depends on Strip Thickness—The line speed is changed according to the thickness of the strip so that a constant weight per hour is produced for a given width. Tension of the strip between the feeding and the main pinch rolls is adjusted for variations in the width and thickness of the strip.

Operation of the oxidizing furnace is controlled to produce strip temperature at the exit end of the furnace in the range of 750 to 850° F. The firing pattern of the furnace is adjusted for strip widths to insure uniformity of surface oxidation across the width of the material.

Temperature Maintained Automatically—The temperature in the reducing furnace is controlled automatically and set according to the heating cycle. The rate of temperature decrease in the cooling furnace is also maintained automatically by temperature controls for individual zones in the furnace. The cooling or heating media are engaged automatically enabling the strip to arrive at the pot at the desired temperature range of 900 to 950° F.

Either normalizing or subcritical annealing cycles can be used in the process. Normalizing and annealing cycles with controlled cooling are shown in Fig. 5. These indicate the strip temperature at various locations in the furnace. Somewhat better and more uniform physical properties of the base metal can be obtained when a normalizing cycle is used.

Temperature Fluctuations Harmful—The temperature of the zinc bath is maintained in the range of 850 to 860° F. It is essential that fluctuation of the zinc temperature be avoided. Increased temperature causes greater solution of iron in the zinc; then when the bath temperature lowers the iron comes out as a fine dross in the coating.

Aluminum content of the bath is maintained by the addition of zinc-aluminum alloy (10 per cent Al) in the amount of approximately 2 pounds of aluminum per 1000 pounds of added zinc.

Coating weight is regulated by adjusting the position of the centerline of the exit rolls with respect to the level of the molten zinc in the bath, just as in conventional galvanizing. Cleanliness of the coating is secured by using scraping blades on the exit rolls.

After 10 to 12 weeks of continuous shut down for a drossing operation: The procedure for shutting down is the reverse of that for starting up: Strip is run out of the furnace; the temperature of the furnace is lowered; the reducing atmosphere is burned out; and the drossing operation is then performed. Shutdown periods are also utilized for any maintenance work that cannot be performed while the line is in operation.

Product Produced—The commercial zinc coated product known as Zincgrip, is produced in cut length sheets and coils in thicknesses from 0.018 to 0.115-inch and in widths up to and including 48 inches. It can be produced in any specified weight of coating up to 2.50 oz./sq. ft. A Bonderized surface is supplied when paintability and improved paint adherence are the requirements.

The average mechanical properties of the base metal are listed in the accompanying table.

The complete elimination of the most brittle iron-zinc alloys and the restricted formation of the other less brittle iron-zinc alloys results in excellent adherence and ductility of the coating. No separation of the coating from the base metal occurs even under severe forming, spinning, and deep drawing operations.

Annealing and coating in a continuous manner results in a remarkable product uniformity, especially in mechanical properties of the base metal and in weight, distribution, adherence, and ductility of the zinc coating.

Bends Straights Into Zig-Zags

STRAIGHT steel bars are bent into zig-zag shapes for use as continuous web members in roof trusses by a novel bar bending machine, developed by engineers of Bethlehem Steel Co., Bethlehem, Pa. The bar is bent over adjustable dies by a roller which enables a bar of any desired length to be fed straight into the bending machine.

The roller, manipulated by a gear and cam, is arranged so the bar can proceed through the dies without obstruction. Machine is said to be capable of making 6 to 20 bends per minute, according to the bar size, the bars being worked cold. A hand wheel adjusts dies to form the varying angles and varying length of diagonals that are required in a roof truss.

Power is furnished by an adjustable speed electric motor and the machine is operated by a pushbutton control with a limit switch to stop the machine for each bend. Bars up to 1¼ inches in diameter may be bent on the device it is reported by the company.

MILK-TIGHT WELDS: Stainless steel milk storage equipment made by McHale Mfg. Co., Los Angeles, is shown being tested for leaks in welds by a type H leak detector, a development of General Electric Co., Schenectady, N. Y. Refrigerated tanks of up to 15,000 gallons capacity, for storage of milk until ready for processing, must be without leakage or milk being processed would be spoiled. By introducing a small amount of carbon tetrachloride into the refrigerating system, leaks are quickly and easily located by the "gun", barrel of which is passed along the weld

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Spare That Operator!

Mechanical tool-accounting system helps operators keep pace with multioperation machines

JOE DOAKES, today's automatic machine operator no longer has a "soft" job. In fact he is virtually being "mechanized over his head."

Cross Co., Detroit, says some machines with as many as 83 cutting tools in action place a burden on the operator which can be relieved only by providing additional mechanical means—to keep account of tools and to speed tool-changing operations.

The company proved its point by developing a machine control unit that does three things: Simplifies tool grinding, reduces scrap and saves as much as 82 per cent of time required to change tools. By enabling the operator to keep pace with the machine, the development also reduces indirect labor costs.

The Setup—Basic components of the setup consist of a master control board, master tool setting fixture, work bench and meters called "toolometers" which shut down the machine automatically when tools need changing or the job is finished.

The board is divided into sections for each type of tool in the machine. Each section comprises a tool setting gage, tag with the perishable tool and holder numbers, storage space for two complete sets of tools and holders and "toolometers." Letters on the board and corresponding ones on the machine heads further group the tools and guide the operator.

Colored areas on the control board point out the location of the machine head—yellow, for example, indicates a right-hand horizontal head, red, a left-hand horizontal head and blue a vertical head. Tags with the perishable tool numbers give on-the-job information for requisitioning worn parts.

How It Works—The "toolometers" provide visual records of used and unused life of every tool in the machine. Meter printers index counter clockwise with every machine cycle. When any of the pointers reaches zero, or any danger zones the machine stops. In event of the latter, all tools in the danger zones are replaced. Meters then are reset manually to positive stops which establish starting positions. The stops are adjustable to provide different settings for various types of tools and amounts of work.

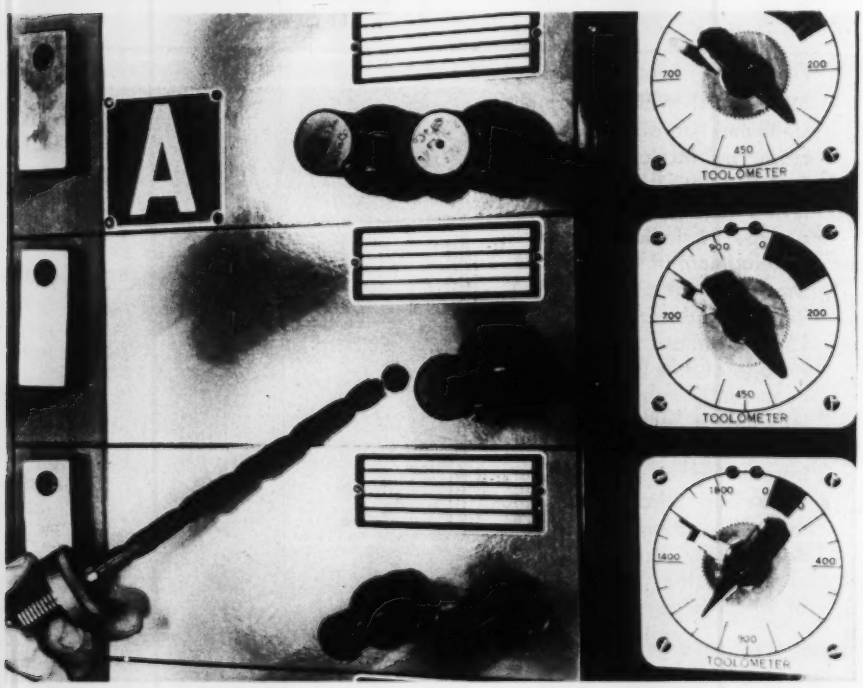
All tools are assembled in adjustable holders and preset to standard lengths with gages stored in the control board. Tools then are placed in the board for standby use. Two sets are on hand at all times in case one tool is damaged during installation.

Tumbles Down Time—Fact that tools are preset and can be used for replacement without machine adjustments accounts for remarkable decrease in down time. Time studies show that actual changing of a tool requires only two minutes now; it takes seven minutes for a conventional tool change. Added to this saving is the economy of changing tools in groups.

For example, with ten minutes for stopping and starting the machine, down time for changing one preset tool is 12 minutes. For ten tools it is 30 minutes—a saving of nine minutes per tool. Benefits gained may amount to as much as 14 minutes per tool change.

REDUCES MACHINE DOWN TIME

. . . multioperation control unit meters, right, indicate used and unused life of every tool in use; convenient arrangement of tool setting gages, preset tools and tags help speed tool changing



512 Pieces per Hour

TWENTY-ONE seconds is the work cycle on a recently introduced six-station vertical drilling and tapping machine for differential bearing caps recently introduced. Capable of drilling, spot-facing, chamfering and tapping 480 caps per hour at 80 per cent efficiency, or 512 at 100 per cent efficiency, the machine is said to be completely automatic after the starting button is pressed. It is electrically interlocked for safety and may be operated by unskilled labor, the company, Snyder Tool & Engineering Co., Detroit, reports.

Four parts are loaded at the first station by the operator on the left and hydraulically clamped. Fixture is then automatically indexed by a standard Geneva index to the second station where eight large holes are drilled and four small holes are countersunk. All twelve holes are spotfaced at the third station, and four small holes are drilled and eight large holes are finish-drilled at the fourth station. At the fifth station, the four small holes are tapped, while the sixth station is for unloading, an operation performed by the operator at the right.

High speed steel tools are mounted in standard Snyder multiple spindle heads moving on hardened and ground guide bars. All tools are gear driven.

Brush Research May Help You

IN AN EFFORT to help industry and all users of brushes to solve their cleaning problems, Schaefer Brush Mfg. Co., Milwaukee, Wis., has instituted a new brush research and development division. If necessary, an engineer will be sent to the job for first hand information on the particular cleaning problem. However, in most cases, by sending the problem with proper information to the company, it will be able to develop and recommend a suitable brush.

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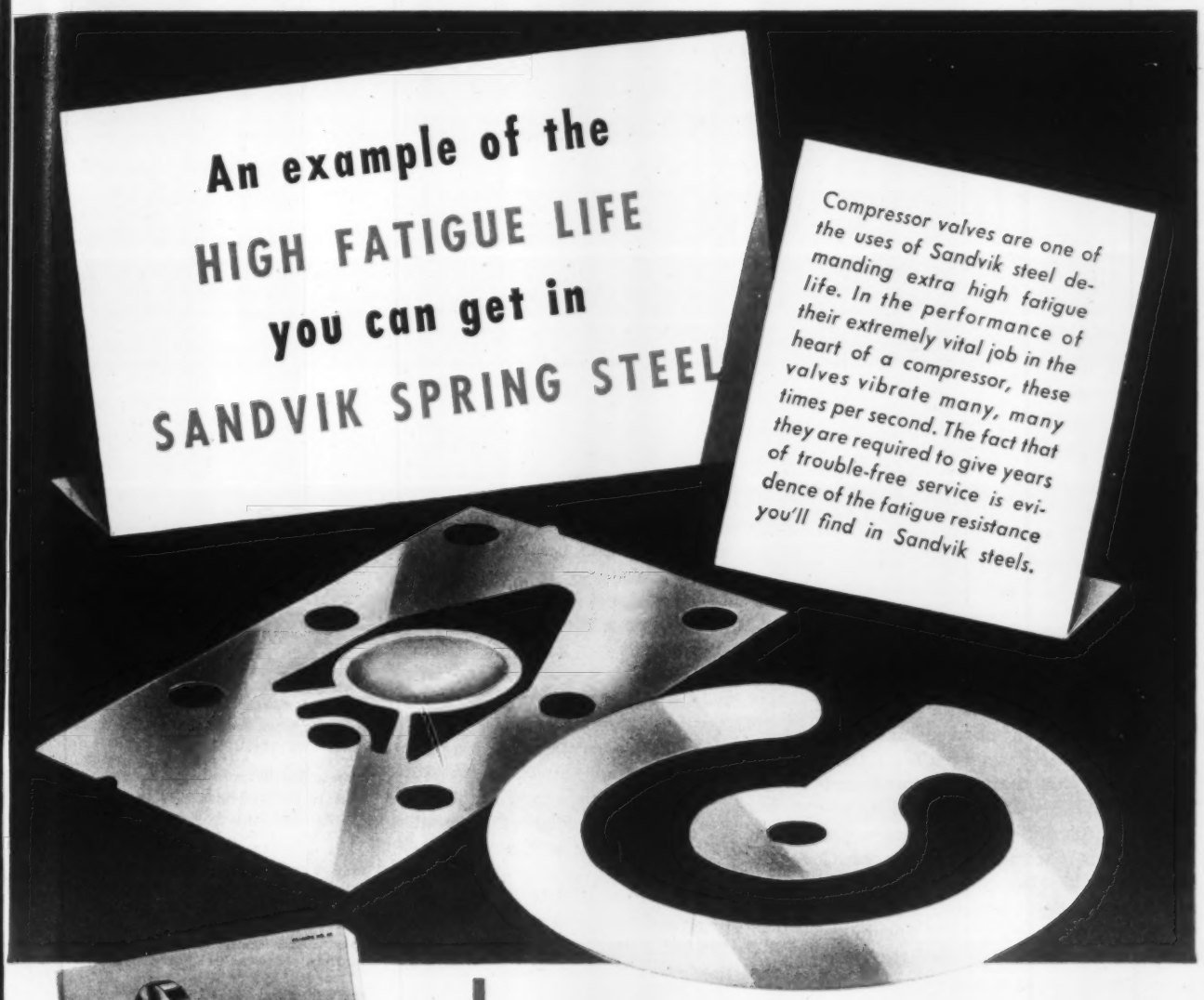

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Standardization

(*Concluded from Page 93*)

Following the establishment of a uniform spacing of T-slots, tapped holes etc., the question arose as to whether the program should not cover all sizes of presses being manufactured by the various press builders. A survey of GM divisions, other large press users and the size listings in catalogs of press builders disclosed a preponderant number of sizes, amounting to more than 750 in all, which in many instances increased in increments as small as ¼-inch left to right and front to back. This condition was attributed to the fact that the size of the press bed usually is designed for a particular job at a particular time.

Number of Press Sizes Reduced— Detailed study of the automotive industry's needs suggested this large number of press sizes could be reduced by establishing a range of sizes which would increase in uniform increments, left to right and front to back, consideration being given to those sizes which showed majority usage and those considered for future use. From this analysis it was found that the number of sizes could be reduced to 76, not including tonnages and strokes, thus effecting standardization which, when properly applied, could yield the following: 1. Lower inventory, with fewer sizes and more interchangeability. 2. Lower purchase price resulting from quantity buying on fewer sizes. 3. Better workmanship resulting from building "more of the same thing". 4. Facilitation of inspection. 5. Simplification of service and maintenance.

With these apparent benefits attainable, similar standardization programs were undertaken on the double-action type of press; the straight-side single-action single-point press, and the inclinable and C-frame types of presses.

As of the present time, mounting dimension standards have been written and printed for inclusion in the General Motors Standards Book covering single-action multiple - point presses; single-action multiple-point rail or frame presses; double-action single and multiple point presses; and single-action straight-side single-point presses. In process are similar specifications for open-back gap-frame presses; triple-action presses, and welding presses.

Of the six standardization programs GM's production engineering section thus far has undertaken, three —electrical, hydraulic and welding transformers—come under the supervision of the plant engineers committee. Three—carbide tools, machine tool spindle adaptors and pressroom equipment are tied in with the master mechanics committee, while carbide materials, tool steels and shot peening are supervised by the metallurgical committee.

Suppliers Accept Standards — Acceptance by suppliers of the JIC standards has been gratifying. Many now are showing in their catalogs how new equipment conforms to JIC specifications. This is an interesting trend, since historically equipment builders have been a little jealous of their own designs and somewhat loath to join in with competitors to standardize. In the long run, however, it would appear that both buyer and seller will benefit from the programs, since standardization, reduction of the number of different sizes and types and conformance to uniform identification, etc., will mean lower costs for the supplier which he in turn can pass along, in part at least, to the buyer. And this means not only General Motors but the entire metalworking industry.

Naturally, standardization programs of this magnitude are going to take time—perhaps many years—to bring into effective action and acceptance. Capital equipment cannot be tossed out overnight just because it does not conform to new standards. And replacement parts for older equipment cannot be shut off for any such reason. But it is possible to base new equipment purchases on the new standards, and as fast as old units are scrapped to replace them with standardized types of new devices.

Your Geiger Counter Circular

NATURE, construction and use of the Geiger-Muller counter for detection of radioactive radiation is presented on an elementary level in a booklet published by National Bureau of Standards, Washington, D. C. Designated as circular 490, and available from the U. S. Government Printing Office, the booklet discusses methods of detecting counter pulses, applications of counters to quantitative measurements, proportional counters and the preparation and filling of Geiger-Muller counters.

Computations Come Easy

JUST a matter of seconds is required to figure the time and cost of each part and complete run on fabricators made by Wales-Strippit Corp., North Tonawanda, N. Y., the assist being given by a time estimating slide rule recently made available. Rule consists of a movable disk containing a time scale graduated to indicate minutes, with sub-divisions of tenths of minutes. This scale is free to rotate inside of four other stationary scales which indicate back stops, finger stops, different punches and hole punching and notching operations.

CALENDAR OF MEETINGS

† Denotes first listing in this column

June 12-15, American Electroplaters' Society: Annual convention and international conference on electrodeposition, Hotel Statler, Boston. Society headquarters address is P. O. Box 168, Jenkintown, Pa.

†June 12-16, American Society of Mechanical Engineers: 22nd oil and gas power conference and exhibit, Lord Baltimore Hotel, Baltimore, Md. Society is located at 29 W. 39th St., New York 18.

June 13, Stoker Manufacturers' Association: Annual meeting LaSalle Hotel, Chicago. Address of association: 307 N. Michigan Ave., Chicago 1.

June 15-17, Material Handling Institute: Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute headquarters are in the Clark Bldg., Pittsburgh 22.

June 16, Wire Association: West coast regional meeting, Sir Francis Drake Hotel, San Francisco. Association is located at 300 Main St., Stamford, Conn.

June 16-17, American Society for Metals: Seventh biennial Pennsylvania interchapter meeting, State College, Pa. Society headquarters: 7301 Euclid Ave., Cleveland 3.

June 19-23, American Society of Mechanical Engineers: Semiannual meeting, Hotel Statler, St. Louis. Society headquarters are at 29 W. 39th St., New York 18.

June 21-22, Caster & Floor Truck Manufacturers' Association: Summer meeting, Skytop Lodge, Skytop, Pa. Association offices: 7 W. Madison St., Chicago 2.

June 22-23, Malleable Founders' Society: Annual meeting, The Homestead, Hot Springs, Va. Society headquarters are in Union Commerce Bldg., Cleveland 14.

†June 22-24, American Society of Mechanical Engineers: 16th national applied mechanics division conference, Purdue University, Lafayette, Ind. Society is located at 29 W. 39th St., New York 18.

June 26-30, American Society for Testing Materials: Annual meeting and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Headquarters of society: 1916 Race St., Philadelphia 3.

June 26-July 21, Product Design Seminar: Lehigh University, Bethlehem, Pa. Sponsored by Lehigh and Society of Industrial Designers, 48 E. 49th St., New York 17.

July 12-14, American Society of Civil Engineers: Summer convention, Toronto, Ont. Society headquarters are at 33 W. 39th St., New York.

July 12-14, American Home Laundry Manufacturers' Association: Meeting, Atlantic City, N. J.

July 28, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are in the Union Commerce Bldg., Cleveland.

Aug. 7-19, First U. S.-International Trade Fair: Coliseum, International Amphitheater and Navy Pier, Chicago. Fair headquarters are in Congress Hotel, Chicago.

Aug. 14-16, Society of Automotive Engineers: West coast meeting, Biltmore Hotel, Los Angeles. Society headquarters: 29 W. 39th St., New York 18.

Aug. 16-18, Third Western Packaging and Materials Handling Exposition: Civic Auditorium, San Francisco. Additional information from Clapp & Poliak Inc., 341 Madison Ave., New York 17.

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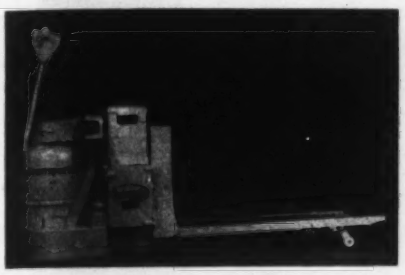
New Products and Equipment

Shorter Walkie Truck

A cast drive housing protects the operating parts of the redesigned model 101 driver-led Transporter electric industrial truck introduced by Automatic Transportation Co., 149 W. 87th St., Chicago, Ill. The truck has a solid steel enclosure protecting the battery.

Units are available in 4000 and 6000-pound capacity models in either pallet or platform type. Pallet model

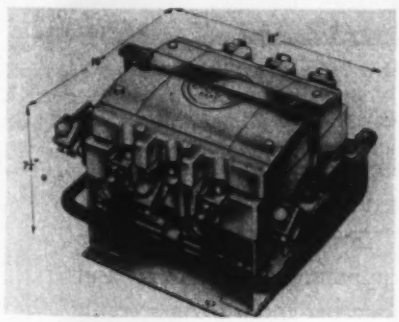


is 12 inches shorter and the platform model 5½ inches shorter than previous models. Forward or reverse operation in both speeds is possible with handle in upright position, saving another foot in close quarters. Better weight distribution brings about better traction with less power. Braking is on the motor shaft through the entire gear reduction. Drive mechanism is fully enclosed.

Check No. 1 on Reply Card for more Details

Small Magnetic Starter

Compact design achieved through use of right angle balanced mechanism which employs full magnet power without lifting extra weight, is incorporated in the size 4 RA mag-



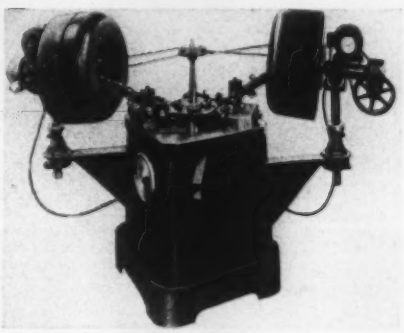
netic starter, developed by Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6 Conn. A knee-action bellcrank fulcrum multiplies the leverage and transfers it from a vertical to a horizontal plane. Contact pressure is increased while wattage consumption is reduced. Arc is guided across and between quenching and baffle plates for maximum suppression.

High heatproof silicon chutes enclose each contact. Wiring is straight through, and the design permits ample working space for ease of installation and servicing. Terminals are accessible from the top. Calibrated, thermal-type overload relays have one-piece interchangeable heaters.

Check No. 2 on Reply Card for more Details

Roll Threads Rapidly

Designed to roll thread lengths up to 2⅛ inches on sizes up to ¼-inch and capable of production of 25,000 per hour is the Rollmaster No. 120 automatic thread rolling machine, made by D. H. Prutton Machinery & Tool Co., 5295 W. 130th St., Cleveland,



O. Machine holds a consistent thread tolerance of class 3 or better. It is a two-station, rotary type machine, either side being capable of independent operation.

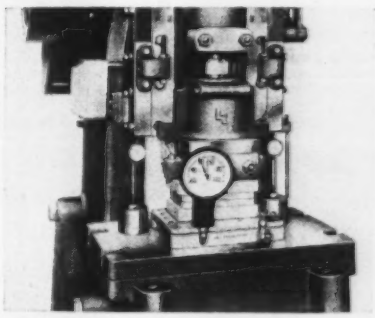
Adjustomatic feeding barrel, offered as a separate item, may be attached to the machine for feeding 15,000 ¼-inch bolts per hour. Adjustability for height, angle speed and spill lend it to a large variety of densities, weights and sizes. Feeding barrel is available in various sizes covering the small parts range. Illustration shows an automatic thread rolling machine equipped with two feeding barrels.

Check No. 3 on Reply Card for more Details

Tests Punch Presses

L & J Press Corp., Elkhart, Ind., is introducing a punch press tester, a hydraulic device with a recording gage placed on the press bed to measure pressure in tons exerted by the ram, either directly or through a die. At the same time, dial indicators located at both sides of the bed and contacting the gibways measure any frame deflection. This permits an accurate determination of any deflection at any ram pressure, as well as pressure being applied on any particular job.

Frame deflection, important to punch press users as it causes die misalignment, results in inaccurate stampings and decreased die life. Designing of press frames based upon



formulae alone does not eliminate the need for measuring deflection under actual working conditions with such an instrument.

Check No. 4 on Reply Card for more Details

Knocked-Down Conveyor

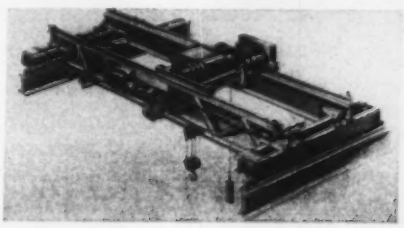
Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y., is offering a horizontal belt conveyor which makes it possible to install standard units to make up any desired length or width. Units consist of a drive unit with motor and control equipment, tail end with 4-inch diameter crowned-face tail pulley and tracking idler, H-type stands with return idlers, choice of belt and standard 10-foot sections of roller or slider bed conveyor.

Belts are available in 8 to 36-inch wide widths in increments of 2 inches in a selection of types including solid woven cotton, stitched canvas and rubber covered. Standard speed is approximately 50 fpm.

Check No. 5 on Reply Card for more Details

Lower Cost Crane

Cranes of the E-type, made by Whiting Corp., Harvey, Ill., are available at lower initial cost because en-



gineering design makes use of stock parts and other components which may be built in quantity and assembled without individual engineering.

an $8,000,000 expansion program for the production of ST. JOE electrothermic ZINC

The St. Joseph Lead Company's electrothermic smelter at Josephtown, Pa.

The plant operates as a custom smelter, receiving both domestic and foreign concentrates. Constructed in 1930, it was designed to process 3,600 tons per month of zinc concentrate obtained mainly from the Company's zinc mines in St. Lawrence County, N. Y. Expansion of the plant and equipment during 1939 and 1940 brought the processing capacity to about 9,000 tons of concentrate per month. As a result of a postwar expansion program completed in 1950, at a cost of about $8 million, the smelter's processing capacity has increased to 16,000 tons. The following grades of electrothermic zinc are produced: **HIGH GRADE • INTERMEDIATE • BRASS SPECIAL • PRIME WESTERN**

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE, NEW YORK 17, NEW YORK, ELdorado 5-3200

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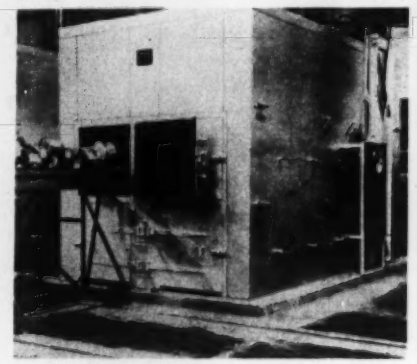
These units are built in capacities ranging up to 12 tons, and in spans from 20 to 60 feet. All are designed for intermittent duty and usually are operated from the floor by means of a pendant pushbutton control station.

Bridge or trolley (or both) may be supplied without motors for handpower operation, if desired; the crane may be supplied with cab control. Additional features include fluid drive, magnetic control, a design which permits higher lift of the hoist by keeping down headroom requirements, and a rigid bridge.

Check No. 6 on Reply Card for more Details

Air Drawing Furnaces

Designed by Lanly Co., Cleveland, O., are two air drawing furnaces for crankshafts, but adaptable to various other uses. Capacity is four crankshafts and load is 2000 pounds per charge. Cycle is 1 hour. A bulit-in recirculating type gas-fired heating



system has a capaicty of 1 million Btu per hour and a maximum temperature of 900° F.

Uniform operating conditions are assured by placing each crankshaft in an individual cylinder during the treatment process. Heated air at high velocity is supplied through jets extending the full length of the cylinder. Dampers control flow of air in supply and return openings. Proportioning type potentiometer controller serves to maintain temperature at the desired level.

Check No. 7 on Reply Card for more Details

Bends to 180 Degrees

Positioning at any point on the tubing without disassembly and 180-degree bends are advantages of the gear-type tube benders developed by Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. Designed for use with copper, brass, aluminum or steel tubing, including Bundy and thin-wall conduit, benders have a high gear ratio which makes bending easy. Individual units are for ½, ⅝, ¾,

This REFERENCE BOOK on FORGINGS...

It can help you reduce cost at the point of assembly!

There are thousands of instances where forgings have reduced the cost of parts at the point of assembly. This booklet containing 60 pages of authoritative information on forgings formed to close tolerances by use of closed impression dies tells how cost reductions may be obtained. Forging production techniques are described and illustrated.

Forgings provide rapid assembly of complex parts by welding adaptability of widest range; forgings permit reduction of dead weight because maximum strength and toughness are obtainable in lighter sectional thicknesses; forging to shape avoids waste of metal and reduces machining and finishing time-cost. The metal quality and cost-reducing possibilities obtainable in forgings cannot be equalled or duplicated.

Recheck every stressed part in your equipment, as well as simple handles and levers, and consult a forging engineer about possibilities for reducing costs at the point of assembly. Only a forging engineer can inform you fully regarding the numerous advantages obtainable with forgings. Your copy of this reference booklet on forgings is available now. Attach coupon to your business letterhead.

DROP FORGING ASSOCIATION
[illegible] BUILDING
CLEVELAND 15, OHIO

Please send 60-page booklet entitled "Metal Quality — How Hot Working Improves Properties of Metals," 1949 Edition.

Name_____

Position_____

Address_____

Company_____

⅞ and 1⅛-inch OD tube sizes, nominal tube sizes ⅜, ½, ⅝, ¾ and 1-inch. There are also combination benders that take several sizes.

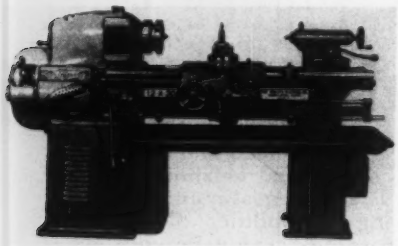
Tubing will not flatten or kink, due to precision fit of bender and fact that bends are formed by action sim-

ilar to original drawing of tubing. Because the benders are of the open side type, they may be slipped over tubing at exact point where bend is desired. They are designed so that they may be held in the hand or clamped in a vise.

Check No. 8 on Reply Card for more Details

General Purpose Lathe

Induction hardened and precision ground bed ways are incorporated in the general purpose No. 1 model lathe, built by Hendey Machine Co., Torrington, Conn. Available in sizes 12 x 30 inches, 12 x 42 inches, and 12 x 54 inches, all have a maximum swing over the ways of 14½ inches. The spindle, driven by five v-belts, has its speed varied by a single lever



belt shifter from four-step cones mounted on the 3 hp reversing motor and on the jack shaft.

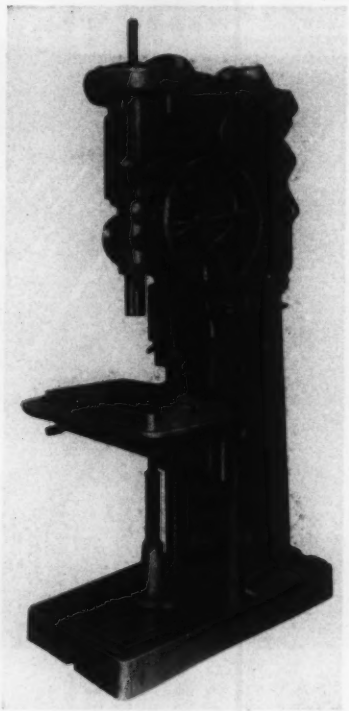
Spindle speeds range from 30 to 1142 rpm, covering speeds necessary for carbide tools and fine work finish. There are 36 speed selections for threading from 1½ to 80 rpm and 36 selections for feeds from 0.0031 to 0.1666-inch. Motor is in fully enclosed cabinet leg. Total enclosed headstock, automatic apron stops for both directions and latch lever apron controls are other features.

Check No. 9 on Reply Card for more Details

Production Drilling Machine

Speed changes are controlled with one lever and feed changes with a single dial on the No. 201-¼ drilling and tapping machine, developed by Barnes Drill Co., 854 Chestnut St., Rockford, Ill. Reverse for tapping is accomplished electronically. On regular drilling operations the spindle continues to rotate and is returned to starting position by handwheel or automatically with coil spring attachment.

On tapping operations with thread-leading feed attachment, feed re-



mains engaged and direction of rotation is tripped to forward at the upper position. Circuit can be arranged for stopping in that position or for high production, the cycle can continue uninterrupted. Machine is offered with a wide variety of gear speeds and feeds. Single spindle and gang types with up to floor spindles are also offered.

Check No. 10 on Reply Card for more Details

Versatile Spot Welder

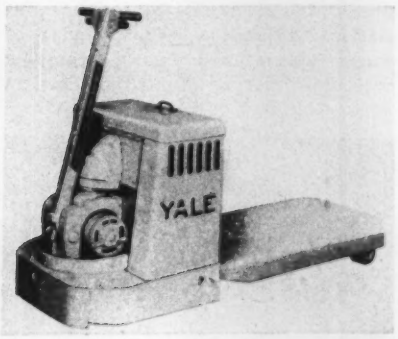
Producing welds with a minimum of surface discoloration and disturbance so that surface finishing is held to a minimum or eliminated entirely is the model B-100 Fusionette spot welding machine, made by Primeweld Corp., Detroit, Mich. It is capable of: Welding stock from 0.004 to 0.100-inch, welding thick to thin stock, stock, welding aluminum up to 0.040-inch without special preparation, welding stainless steel with a minimum of surface discoloration.

Upper and lower electrode arms, transformer and a 4-point tap selector plug are mounted on a cast aluminum bronze frame. Upper electrode arm can be extended 5 inches to increase throat depth. Lower arm is adjustable 4 inches. Electrode holders 1½ inches in diameter are supplied in 4 and 9-inch lengths. Quick disconnects on air, water and electric wiring lines facilitate moving. Unit is designed for use on 110-220 v ac 60 cycle current.

Check No. 11 on Reply Card for more Details

Shorter Power Truck

Six inches shorter than previous "walkie" models of the same type is the Stubby Worksaver electric lift truck, announced by Yale & Towne Mfg. Co., Philadelphia, Pa. Savings are effected between battery box and front edge of truck, thus retaining full platform lengths for handling skids and skid bins. It is available in 4000 and 6000-pound capacities.



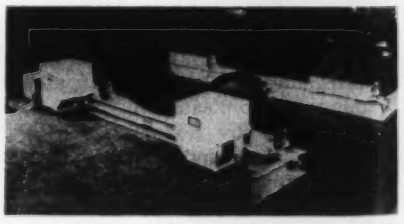
Standard platform lengths range from 36 to 72 inches.

Heights of 6, 7, 9, 10 and 11 inches are available for handling skids of different heights. Platform widths are 19, 24 and 26 inches. Lifting is by hydraulic mechanisms. Twin hoist cylinders are equalized for uniform lifting of loads. A solenoid operated lowering valve with built in flow regulation gives controlled lowering for cushioning action upon descent of load.

Check No. 12 on Reply Card for more Details

Rotates Light Gage Tanks

Automatic welding and rotation of light gage tanks is possible without ring or stiffener with the TracTred



turning roll, made by Aronson Machine Co., Arcade, N. Y. Designed to cradle the tank during automatic welding or other processing, the rolls

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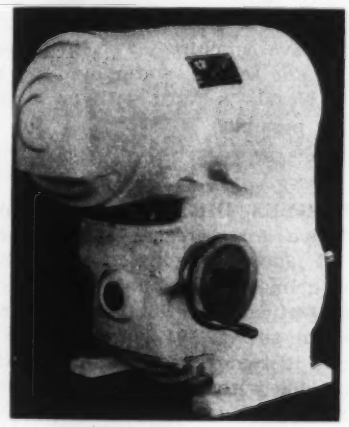
have speeds which are infinitely variable from 0 to 100 inches per minute. A screw jack which travels only 4 inches adjusts the equipment for tanks from 5 to 10 feet in diameter.

Turning rolls are designed for 10,000 pounds capacity with a powered set and idler set, although an extra idler set may be used to increase the capacity to 15,000 pounds. Uniform contact throughout the bottom side of the tank varies from 68 to 105 degrees, this cradling serving to prevent buckling or denting. The resilient rubber feet act as shock absorbers.

Check No. 13 on Reply Card for more Details

Speed May Be Sealed

Variable speed Speed-Trol motors, made by Sterling Electric Motors Inc., Los Angeles, Calif., now are available with provision for sealing speeds at a positive setting or within any predetermined range of speeds. Mounting dimensions of these motors



are interchangeable with standard NEMA motors.

New motor is available in totally enclosed, splash-proof or drip-proof models. Application may be on agitators, mixers, blenders, grinders, feeders or any process where control of speed will improve quality or quantity of production.

Check No. 14 on Reply Card for more Details

• • •

COOL, DRY AIR: For cooling compressed air, Jas. A. Murphy & Co. Inc., Hamilton, O., offers type V-907 aftercooler. It is available in two sizes, 30 inches and 48 inches overall. Air inlet and outlet pipe sizes up to 1 inch may be specified.

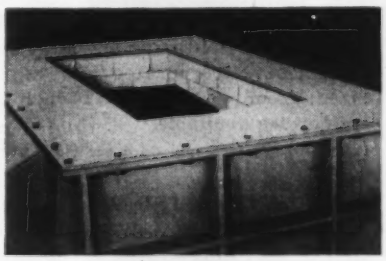
Check No. 15 on Reply Card for more Details

EASES SHOP WORK: Lift-All, a new electric hoist designed for one-man operation, is offered by Lift-All

GALVANIZING by induction *

Seven ton capacity Ajax Low Frequency Induction Furnace now in use for Hot Dip Galvanizing.

another AJAX First



Showing the heavy refractory brick lining walls containing the molten zinc. No iron kettle is used.

Now Ajax engineers have developed a galvanizing furnace lined with an inert refractory material. The melt is internally heated by the electric induction principle introduced by Ajax more than thirty years ago. Costly iron kettle replacements and dross formation from iron kettle are eliminated. Internal circulation assures complete uniformity of temperature.

FASTER PRODUCTION • UNIFORM QUALITY
LESS MAINTENANCE • LOW OPERATING COST
ABSOLUTE TEMPERATURE CONTROL • LONG
LIFE • REDUCED DROSSING • NO HOT SPOTS
SMALLER ZINC BATH POSSIBLE

AJAX ENGINEERING CORPORATION
TRENTON 7, N. J.

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non-Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

Equipment Co., Portland, Oreg. It will hoist, lower, stop and hold weights up to 2000 pounds. Hoist operates on its own shop dolly or from any desired position on a truck bed. Using pushbutton control, operator is free to move about for load guidance. Boom is adjustable for height, swings completely around with load.

Check No. 16 on Reply Card for more Details

CUT LARGE KEYWAYS: Minute Man keyway broaches, developed by du Mont Corp., Greenfield, Mass, cut large size keyways, ⅞-inch and 1-inch. They are equipped with staggered teeth to provide ample chip room for heavy cuts in long bores. Shank end is provided with a ½-inch reamed hole for quick locating and alignment of an extension shank.

Check No. 17 on Reply Card for more Details

CENTRIFUGAL PUMPS: Designated as Motor-Mount, new centrifugal pumps in vertical and horizontal types are available from Deming Co., Salem, O. Capacities range up to 200 gallons per minute; heads up to 65 feet. Motors are ¼ to 7½ hp with speeds of 1750 and 3500 rpm.

Check No. 18 on Reply Card for more Details

BREAKS UP WHIRLPOOL ACTION: Designed to break up whirlpool action to produce both horizontal and vertical mixing, is the new laboratory mixer made by Fisher Scientific Co., Pittsburgh 19, Pa. It can be used for liquid-liquid, liquid-solid or liquid-gaseous dispersions. Mixer uses slightly curved, rotating paddles to effect actual agitation.

Check No. 19 on Reply Card for more Details

INGOT MOLD WASH: Development of Mex, a new ingot mold wash, is announced by United States Graphite Co., Saginaw, Mich. It is safe, easy to use, gives off no fumes and is not harmful to skin or clothing. It contains a hydrocarbon for "gas kick" in repelling metal splash.

Check No. 20 on Reply Card for more Details

PLUG-IN PANELETTE: Square D Co., Detroit, Mich., announce a new plug-in multi-breaker panelette as a companion to their NMO panelboard. Thermal-Magnetic plug-in units are rated 15, 20, 30, 40 or 50 amp.

Check No. 21 on Reply Card for more Details

HOOK-ON WATTMETER: A new hook-on wattmeter applicable to active and reactive power measurements in single and polyphase circuits is introduced by General Electric's Meter and Instrument Divisions, Schenectady, N. Y. Designated as type AK-2, it enables measurements to be taken without service interruption. Through use of a single dial switch, a selection of any one of six power measurement ranges is available to provide readings from 3 to 300 kw full scale deflection.

Check No. 22 on Reply Card for more Details

ELIMINATES KINKING: General Machine & Welding Works, Pomona, Calif., offer a complete line of swivels for eliminating wire line twist and kinking. Line consists of fifteen different types of end connections and nine swivel capacities ranging from the AA model rated at 250 pounds working load to the H model at 46,200 pounds working load.

Check No. 23 on Reply Card for more Details

MEASURES DEPTH: No. 644 dial depth gage, made by L. S. Starrett Co., Athol, Mass., is designed for measuring the depth of holes, slots, recesses, etc., ranging from 0 to 3 inches deep. To use gage, flat base is positioned on top of surface of work allowing rod to enter the hole or recess to its full depth. Measurement automatically registers directly on the dial in 0.001-inch.

Check No. 24 on Reply Card for more Details

FACE MILL: Called Tri-Helix, a new carbide tipped face mill for milling steel is offered by Nelco Tool Co., Manchester, Conn. It features nickel shim, sandwich brazing and alloy steel bodies and incorporates new angles. Sizes from 6 through 14-inch diameter are available.

Check No. 25 on Reply Card for more Details

SPEEDS HANDLING: A scoop shovel attachment for fork-lift trucks, designed for full hydraulic operation through the cycle of picking up a load, tilting back for carrying, dumping and return to scooping position, is announced by Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. It may be obtained in widths of 38 to 72 inches, capacities range from 6 to 15 cubic feet.

Check No. 26 on Reply Card for more Details

ELECTROLYTIC CLEANER: Alkon, a new electrolytic cleaner, is introduced by DuBois Co., Cincinnati 3, O. It is suitable for either direct or reverse current cleaning of both ferrous and cuprous metals. It features foam control to eliminate solution spattering and minor explosions.

Check No. 27 on Reply Card for more Details

INSULATING HOLDER: Lincoln Electric Co., Cleveland 1, O., announces a new electrode holder, LJ-1, designed around an unusually small size and combining the advantages of both tong and hole type holders in providing a strong electrode grip and easy thumb pressure electrode release. It is made in 250 amp size for 1/16 to 3/16-inch electrodes.

Check No. 28 on Reply Card for more Details

PUMPS PETROLEUM PRODUCTS: IMO series A313A pump, introduced by De Laval Steam Tubine Co., Trenton 2, N. J., is designed for pumping petroleum products and other light or viscous fluids in volumes to 85 gallons per minute against pressures up to 150 psi, as required for rotary and steam atomizing oil burners, oil transfer, hydraulic systems, etc.

Check No. 29 on Reply Card for more Details

AIR-OPERATED CONTROLLERS: The air-operated controllers introduced by Penn Industrial Instrument Corp., Philadelphia 32, Pa., can be supplied with any of the control functions generally required for process work, such as on-off, proportional control, automatic reset and derivative action. Both nozzle and restriction have sapphire jewels to prevent wear due to dirt, water or oil in the air. Nozzle is fixed with no adjustment possible.

Check No. 30 on Reply Card for more Details

REMOVES DIRT: A new cleaning solution for personal safety equipment such as goggles, respirators and helmets is announced by American Optical Co., Southbridge, Mass. Known as No. 101 germicidal detergent, it removes dirt and deposited skin oils without inducing corrosion, staining or deterioration of rubber, plastic or metal parts.

Check No. 31 on Reply Card for more Details

ELEVATING ATTACHMENT: For raising or lowing the work table of any J&L pedestal type comparator, a motor-drive unit has been developed by Jones & Lamson Machine Co., Springfield, Vt. It is operated by a single switch lever. Extremely delicate final adjustments are obtained by manually turning a knurled knob mounted on motor shaft below control lever.

Check No. 32 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

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Market Summary

UPWARD pressure on finished steel prices is mounting. Resistance to steadily rising raw material costs is weakening in some areas of the market. But no general advance in prices appears in immediate prospect. All the large producers deny important increases are contemplated at this time. But they do express concern with respect to the deteriorating position of the established steel price structure in relation to production costs. Last week one medium-sized producer succumbed to the pressure of higher scrap and other costs, raising sheet and strip prices $3 to $7 per ton. Several smaller producers have stepped up prices on various products over recent weeks. And additional nonintegrated companies are believed certain to take similar action unless the rise in their production costs is checked quickly.

OUTLOOK— The overall market presents an extremely bullish appearance. Demand continues unusually strong for all major products with the mills sold out months ahead. And inflationary elements for a forward price movement persist generally, except that last week it appeared the runaway in scrap was slowing down. There is little question in the market even the larger steelmakers will be compelled to revise price schedules should the inflationary spiral continue. Sharon Steel Corp., has raised sheet and strip prices $3 to $7 per ton. Other changes noted in the week included advances of $7 per ton on cold-rolled strip by Detroit Tube & Steel Co., Blair Strip Steel Co., and Follansbee Steel Corp., and an advance of $8 per ton on galvanized pipe by Mercer Tube & Mfg. Co. Sharon's move is considered highly significant since it is the largest steelmaker to take action on prices in the current situation.

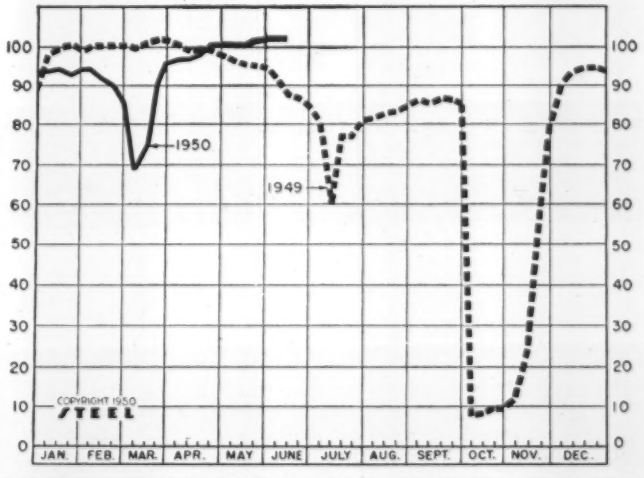
COMPOSITES— Despite the continued isolated price advances STEEL's weighted index of finished steel prices continues to hold at 156.13. This compares with 152.90 a year ago. The arithmetical composite on finished steel also is unchanged since increases the past week fell within the top and bottom of the range previously quoted by the separate producers. This composite holds at $94.32 and compares with $92.09 last year at this time. Pig iron composites also are steady with No. 2 foundry, $46.47, basic, $45.97 and malleable, $47.27. An increasing amount of foreign iron is being imported below the domestic market, but import prices showed signs of advancing last week. The composite on steelmaking scrap rose last week to $40.83, highest since the closing week of January, 1949. It compares with $37.17 a week ago and with $31.67 a year ago.

SCRAP— Signs were developing last week indicating that the runaway in scrap may have been checked, at least temporarily. In the East, at Detroit, Pittsburgh and Cleveland signs of at least a leveling out were in evidence. In some quarters a decline from present inflated levels was expected with scrap coming out in largest volume in months and threat of heavy imports tending to influence a restraining effect on sellers' pricing policies.

PRODUCTION— Steelmaking operations are holding close to the alltime high level and for the sixth successive week ouput exceeded 1.9 million tons in the week ended June 10. Some letdown in activity is thought likely before long since the accelerated production pace is taking its toll of equipment and repairs will necessitate some curtailments before too long. Further, summer vacations next month are likely to cut production to some extent.

DISTRICT RATES— Last week the national ingot rate held at 101.5 per cent of capacity. District rates rose 6.5 points to 91 per cent in St. Louis, 6 points to 101 in the Far West, 2 points to 106 in Cincinnati, 1 point to 86 in New England, and ½ point from a revised rate to 99.5 in Cleveland. Operations declined 1.5 points to 106.5 in Wheeling.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended June 10	Change	Same Week 1949	Same Week 1948
Pittsburgh	101.5	0	82	94.5
Chicago	103.5	0*	98.5	95.5
Eastern Pa.	98	0	85.5	89
Youngstown	106	0	93	103
Wheeling	106.5	— 1.5	80.5	97.5
Cleveland	99.5	+ 0.5*	96.5	95.5
Buffalo	104	0	101.5	98.5
Birmingham	100	None	100	100
New England	86	+ 1	58	78
Cincinnati	106	+ 2	94	96
St. Louis	91	+ 6.5	73.5	89.5
Detroit	104	0	90	100
Western	101	+ 6	85.5	..
Estimated national rate	101.5	0	87.5	96

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.

* Change from revised rate.

News Summary—p. 59 *Production-Engineering News—p. 89*

Composite Market Averages

	June 8 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	152.90	101.78
Index in cents per lb....	4.230	4.230	4.230	4.142	2.757
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.32	$94.32	$93.23	$92.09	$58.27
No. 2 Fdry. Pig Iron, GT	46.47	46.47	46.47	46.07	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT..	40.83	37.17	31.67	21.50	19.00

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	June 8 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35	2.25
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, C.F., Pittsburgh ...	4.10–15	4.10–15	4.10–15	4.00	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.40	2.25
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.50	2.25
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago ...	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–45	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh ...	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT).....	58.00	58.00	57.00–58.00	67.00	36.00
Wire rods, 7/32-⅜", Pitts...	3.85	3.85	3.85	3.775	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt, Pitts...	$46.00	$42.50	$36.00	$23.00	$20.00
No. 1 Heavy Melt, E. Pa..	32.50	32.50	28.50	20.00	18.25
No. 1 Heavy Melt, Chicago	40.00	36.50	30.50	21.50	18.75
No. 1 Heavy Melt, Valley.	44.75	44.75	35.25	22.00	20.00
No. 1 Heavy Melt, Cleve..	42.75	42.75	31.75	18.50	19.50
No. 1 Heavy Melt, Buffalo	42.00	36.75	29.75	21.25	19.25
Rails, Rerolling, Chicago..	52.50	52.50	48.50	27.75	22.25
No. 1 Cast, Chicago	48.50	48.50	42.50	27.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$14.25	$7.50
Beehive, Fdry., Connlsvl...	15.50	15.50	16.00	16.25	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	22.50	20.50	19.50	17.00	12.00
Zinc, E. St. Louis	14.50	13.00	12.00	10.00	8.25
Lead, St. Louis	11.80	11.80	11.80	11.85	6.35
Tin, New York	76.625	78.00	77.75	103.00	52.00
Aluminum, del.	17.50	17.50	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	48.00	48.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
AlabamaCity,Ala. R2	41.88	42.38	....	....
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward,Ala. W15	41.88	42.38	....	....
Cincinnati,del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y., W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14, Y1	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich.,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron,del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle, Tacoma,Wash.,del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
LosAngeles,SanFrancisco,del. ...	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del. (incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides, Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca, del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson,O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2.	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, June 8, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & Slabs
Carbon, Rerolling (NT)
Bessemer,Pa. C3 ..... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2.. 53.00
Munhall, Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 .... 53.00
So.Duquesne,Pa. C3 ... 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ..... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 .65.00
Detroit R7 ..... 66.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ..... 82.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 ... 63.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2.. 63.00
Los Angeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14. 63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 ... 82.00
Warren,O. C17 ..... 63.00

Alloy (NT)
Bethlehem,Pa. B2 .... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3. 68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 ... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14. 66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

SHEETS BARS (NT)
Mansfield,O. E6 ..... $58.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Gary,Ind. C3 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00
So.Duquesne,Pa. C3 .. 76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 .... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 .... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 .... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11. 4.10
Pittsburg,Calif. C11 ... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 .... 3.85
SparrowsPoint B2 ..... 3.95
Sterling,Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston, Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 .... 3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.00
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3 W14. 3.40
So.SanFrancisco B3 .... 3.95
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 ..... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1. 5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

H.S., L.A Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 .... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 .... 4.20
Weirton,W.Va. W6 .... 4.20

BEARING PILES
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 .... 3.60
Conshohocken,Pa. A3 .. 3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 .... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 .... 3.85
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2,Y1. 3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14. 3.50
SparrowsPoint,Md. B2.. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2 Y1. 3.50

PLATES (Universal Mill)
Fontana,Calf. K1 ..... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .... 5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 .... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1. 5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SparrowsPoint,Md. B2.. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.75
Ashland,lcl(15) A10 ... 4.25
Cleveland,cl R2 ..... 4.10
Warren,O.cl R2 ..... 4.10

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 .. 3.45
Atlanta,Ga A11 ..... 3.60
Bessemer,Ala T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.55
Emeryville,Calif. J7 ... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11. 3.45
Pittsburg,Calif. C11 ... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14. 3.45
So.Duquesne,Pa. C3 .... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1. 3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14. 3.95
So.Duquesne,Pa. C3 .... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 .. 3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Atlanta A11 ..... 5.35
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. J2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1. 5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 .... 5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 ..... 4.15
BeaverFalls,Pa. M12,R2. 4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 .... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 .... 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13. 4.15
Hartford,Conn. R2 ..... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 .... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburgh J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .... 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .... 4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 ..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13. 4.90
Hartford,Conn. R2 ..... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 .... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 ..... 5.10
So.Chicago,Ill. R2, W14. 4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass A7 ..... 5.20
Youngstown F3, Y1 .... 4.90

RAIL STEEL BARS
ChicagoHts. (3) C2, I-2. 3.30
ChicagoHts. (4) C2, I-2. 3.45
Franklin,Pa. (3) F5 ... 3.30
Franklin,Pa. (4) F5 ... 3.45
FortWorth,Tex.(26) T4. 4.33
Huntngtn,W.Va.(3) W7. 3.45
Moline,Ill.(3) R2 ..... 3.40
SouthAvis,Pa.(2) J8 ... 3.30
SouthAvis,Pa.(41) J8 .. 3.30
SouthAvis,Pa.(42) J8 .. 3.30
Williamsport(2,3) S19 .. 3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14. 9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 .. 13.50
Dover(Wrgt.Iron) U1.. 12.25
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 ... 11.25
McK.Rks.(Staybolt) L5. 12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 ... 4.35
LosAngeles B3 ..... 5.00
Seattle B3, N14 ..... 5.10
SouthAvis,Pa. J8 ..... 4.35
So.SanFrancisco B3 .... 5.00
SparrowsPt., ¼-1" B2 .. 4.35
Williamsport,Pa. S19 .. 4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 .. 3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 ... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2,Y1. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 ... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 .. 4.35
Seattle,Wash. B3, N14.. 4.20
SouthAvis,Pa. J8 ..... 3.45
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2.. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 .. 3.35
Ashland,Ky.(8) A10 ... 3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 .. 3.45
Detroit M1 ..... 4.15
Ecorse,Mich.(8) G5 .... 3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1. 3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 ... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 .... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 ..... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 .. 4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 .. 5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calif. K1 ..... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1. 5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 ... 5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C2 ..... 5.05
SparrowsPoint(36) B2 .. 5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 ..... 5.05
Youngstown, C3, Y1 ... 5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 ..... 7.06
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1. 6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 ... 6.20
Pittsburgh J5 ..... 6.20
Sharon,Pa. S3 ..... 6.20
SparrowsPoint(38) B2.. 6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 ....4.10
Cleveland J5, R2 ....4.10
Ecorse,Mich. G5 ....4.30
Fairfield,Ala. T2 ....4.10
Follansbee,W.Va. F4 ..5.10
Fontana,Calif. K1 ....5.00
Gary,Ind. C3 ....4.10
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 4.10
Irvin,Pa. C3 ....4.10
Lackawanna,N.Y. B2 ..4.10
Middletown,O. A10 ....4.10
Pittsburg,Calif. C11 ....5.05
Pittsburgh J5 ....4.10
SparrowsPoint,Md. B2..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 ....4.10
Weirton,W.Va. W6 ....4.10
Youngstown Y1 ....4.10

SHEETS, Gal'vd No. 10 Steel

AlabamaCity,Ala. R2 ..4.40
Ashland,Ky.(8) A10 ....4.40
Canton,O. R2 ....4.40
Delphos,O. N16 ....5.15
Dover,O. R1 ....4.75
Fairfield,Ala. T2 ....4.40
Gary,Ind. C3 ....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ....4.40
Irvin,Pa. C3 ....4.40
Kokomo,Ind. C16 ....4.50
MartinsFerry,O. W10 ..4.40
Niles,O. N12 ....4.65
Pittsburg,Calif. C11 ....5.15
SparrowsPoint,Md. B2 .4.40
Steubenville,O. W10 ....4.40
Torrance,Calif. C11 ....5.15
Weirton,W.Va. W6 ....4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3 ....6.75
SparrowsPoint(39) B2 ..6.75

SHEETS, Galvannealed Steel

Canton,O. R2 ....4.95
Irvin,Pa. C3 ....4.95
Kokomo,Ind. C16 ....5.05
Niles,O. N12 ....5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 ....4.65
Middletown,O. A10 ....4.65

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.25
Niles,O. R2 (28) 5.25
Weirton,W.Va. W6 ....5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ....5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10 4.80
Gary,Ind. C3 ....4.80
Mansfield,O. E6 ....4.80
Middletown,O. A10 ....4.80
Niles,O. N12 ....4.80
Weirton,W.Va. W6 ....4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3 ....$17.50
Yorkville,O. W10 ....17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 ....$6.45
Gary,Ind. C3 ....6.35
Irvin,Pa. C3 ....6.35
SparrowsPoint,Md. B2 ..6.45
Yorkville,O. W10 ....6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10 ....$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3 ....$8.10
Warren,O. R2 ....8.10
Yorkville,O. W10 ....8.10

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt, B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS,Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10 ....5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ...3.60
Cleveland R2 ....3.95
Ind.Harbor,Ind. I-2 ....3.60
Warren,O. R2 ....3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ....4.70
Middletown,O. A10 ....4.60
Warren,O. R2 ....4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky(8) A10 ....4.65
Canton,O. R2 ....5.15
Ind.Harbor,Ind. I-2 ....4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 ....4.90
Middletown,O. A10 ....4.90

SHEETS, WROUGHT IRON

	An'ld	Galv.
Apollo,Pa. B14	12.00	15.50

SHEETS, Well Casing

Torrance,Calif. C11 ....4.85

SHEETS, Drum Body

Pittsburg,Calif. C11 ....4.05
Torrance, Calif. C11 ....4.05

SHEETS, Aluminized

Butler,Pa. A10 ....7.75

TIN PLATE, American COKE (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4	7.50	7.70
Ind.Harbor I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5 ....$5.60
Fairfield,Ala. T2 ....5.70
Gary,Ind. C3 ....5.60
GraniteCity,Ill. G4 ....5.80
Ind.Harbor,Ind. I-2, Y1 5.60
Irvin,Pa. C3 ....5.60
Niles,O. R2 ....5.60
Pittsburg,Calif. C11 ....6.35
SparrowsPoint,Md. B2 .5.70
Warren,O. R2 ....5.60
Weirton,W.Va. W6 ....5.60
Yorkville,O. W10 ....5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5 ....5.30
Follansbee,W.Va. F4 ..5.30
Gary,Ind. C3 ....5.30
GraniteCity,Ill. G4 ....5.50
Ind.Harbor,Ind. Y1 ....5.30
Irvin,Pa. C3 ....5.30
Niles,O. R2 ....5.30
SparrowsPoint,Md. B2..5.40
Warren,O. R2 ....5.30
Yorkville,O. W10 ....5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10 ...4.40
Cleveland R2 ....4.40
Ecorse,Mich. G5 ....4.70
Gary,Ind. C3 ....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ....4.40
Irvin,Pa. C3 ....4.40
Middletown,O. A10 ....4.40
Niles,O. M4 ....4.90
Youngstown Y1 ....4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11 ....5.10
Bessemer,Ala. T2 ....4.95
Conshohocken,Pa. A3 ..4.95
Ecorse,Mich. G5 ....5.15
Fairfield,Ala. T2 ....4.95
Fontana,Cal. K1 ....6.64
Gary,Ind. C3 ....4.95
Ind.Harb.,Ind. I-2, Y1..4.95
Lackawanna,N.Y. B2 ..4.95
Sharon,Pa. S3 ....4.95
SparrowsPoint,Md. B2..4.95
Warren,O. R2 ....4.95
Weirton,W.Va. W6 ....4.95
Youngstown C3, Y1 ....4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15.5.10
Carnegie,Pa. S18 ....5.10
Fontana,Calif. K1 ....6.30
Gary,Ind. C3 ....5.10
Houston,Tex. S5 ....5.50
KansasCity,Mo. S5 ....5.70
NewBritn,Conn.(10) S15.5.10
Sharon,Pa. S3 ....5.10
Youngstown C3 ....5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...3.50
Warren,O. R2 ....3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1 ....3.25
Ashland,Ky.(8) A10 ...3.25
Atlanta A11 ....3.40
Bessemer,Ala. T2 ....3.25
Bridgeprt,Conn.(10) S15.3.25
Butler,Pa. A10 ....3.25
Carnegie,Pa. S18 ....3.25
Conshohocken,Pa. A3 ..3.35
Detroit M1 ....4.05
Ecorse,Mich. G5 ....3.45
Fairfield,Ala. T2 ....3.25
Fontana,Calif. K1 ....4.40
Gary,Ind. C3 ....3.25
Houston,Tex. S5 ....3.65
Ind.Harbor,Ind. I-2, Y1.3.25
KansasCity,Mo.(9) S5..3.85
Lackawanna,N.Y. B2 ..3.25
LosAngeles B3 ....4.00
Milton,Pa. B6 ....3.25
Minnequa,Colo. C10 ....4.30
NewBritain(10) S15 ....3.25
N.Tonawanda,N.Y. B11.3.25
Pittsburg,Calif. C11 ....4.00
Riverdale,Ill. A1 ....3.25
SanFrancisco S7 ....4.00
Seattle B3, N14 ....4.25
Sharon,Pa. S3 ....*3.50*
So.Chicago,Ill. W14 ....3.25
So.SanFrancisco B3 ....4.00
SparrowsPoint,Md. B2 ..3.25
Torrance,Calif. C11 ....4.00
Warren,O. R2 ....3.25
Weirton,W.Va. W6 ....3.25
WestLeechburg,Pa. A4..3.25
Youngstown C3, Y1 ....3.25

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10) S15 .9.50
Carnegie,Pa. S18 ....9.50
Cleveland A7 ....9.50
Dover,O. G6 ....9.50
Harrison,N.J. C18 ....9.50
NewBritn,Conn.(10) S15.9.50
Pawtucket,R.I.(11) N8 .9.50
Pawtucket,R.I.(12) N8 ..9.80
Sharon,Pa. S3 ....9.50
Worcester,Mass. A7 ....9.80
Youngstown C8 ....9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ....4.75

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 ..4.15
Berea,O. C7 ....6.60
Bridgprt,Conn.(10) S15 .4.15
Butler,Pa. A10 ....4.15
Cleveland A7, J5 ....4.15
Dearborn,Mich. D3 ....*4.75*
Detroit D2 ....4.40
Detroit M1 ....4.05
Dover,O.(40) G6 ....4.15
Ecorse,Mich. G5 ....4.35
Follansbee,W.Va. F4 ....*4.50*
Fontana,Calif. K1 ....5.40
FranklinPark,Ill. T6 ....4.30
Ind.Harbor,Ind. I-2 ....4.30
Lackawanna,N.Y. B2 ....4.15
LosAngeles C1 ....5.50
Mattapan,Mass.(21) T6.4.65
Middletown,O. A10 ....4.15
NewBritain(10) S15 ....4.15
NewCastle,Pa. B4 ....*4.50*
NewCastle,Pa.(40) E5 ..4.15
NewHaven,Conn. A7,D2.4.65
NewYork W3 ....5.00
Pawtucket,R.I.(21) N8..4.65
Riverdale,Ill. A1 ....4.30
Rome,N.Y. R6 ....4.15
Sharon,Pa. S3 ....*4.50*
SparrowsPoint,Md. B2..4.15
Trenton,N.J.(13) R5 ....4.65
Wallingford,Conn. W2 ..4.65
Warren,O.(40) T5 ....4.15
Warren,O. R2 ....4.15
Weirton,W.Va. W6 ....4.15
Youngstown C8, Y1 ....4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5 ....6.20
Dover,O. G6 ....6.20
Ecorse,Mich. G5 ....6.40
Fontana,Calif. K1 ....6.95
Lackawanna,N.Y., B2..6.40
Sharon,Pa. S3 ....6.20
SparrowsPoint,Md. B2 ..6.40
Warren,O. R2 ....6.20
Weirton,W.Va. W6 ....6.20
Youngstown Y1 ....6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6 ....4.15
Youngstown C8 ....4.15

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8: Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton, W. Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths).	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths).	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths).	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel &Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son,Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11	*3.40*
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	*3.65*
Youngstown C3	3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester A7,J4,T6,W12	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. MS	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	5.65
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. MS	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7, T6	8.75

WIRE, Tire Bead

Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20	4.50
Crawfordsville,Ind. MS	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet,Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-8ga. I-1	5.15
No.Tonawanda B11	4.90
Palmer,Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
SoSanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7, T6	4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. MS	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy.Mo S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. MS	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Crawfordsville MS	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill(1) N15	126

FENCE POSTS	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Minnequa,Colo. C10	121
Moline,Ill. B2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. MS	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville MS	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	112
Crawfordsville,Ind. MS	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	3.75

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. MS	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N. Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20)

	Treated
Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron&Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P8 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango FurnaceCo.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.

T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cds. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) 3" & wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(26) Reinforcing, mill shipments; to consumers, 4.85c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 74" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.037"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅜	5.5c	0.24	36.5	34.5	35.5	8.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	5.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6, quotes 4 points lower; Butler, Pa., ⅛" through ⅜". F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10, Wheatland, Pa., except 2 pts lower on ⅛" through ⅜". W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10% Both Sides	—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
302 ...	....	....	....	19.75	21.50–22.50	75.00
304 ...	22.50	26.50	....	20.75	22.50–24.00	77.00
305 ...	....	....	....	....	....	79.00
309 ...	27.00	31.00	....	....	....	....
310 ...	32.50	36.50	....	....	....	105.00
316 ...	27.00	31.00	....	26.00	28.00–32.00	....
317 ...	30.50	34.50	....	....	....	....
318 ...	29.50	33.50	....	....	....	....
321 ...	23.50	27.50	....	23.00	25.00	90.00
347 ...	25.00	29.00	....	24.00	26.00–30.00	94.00
405 ...	18.75	24.75	....	....	....	....
410 ...	18.25	24.25	....	....	....	....
430 ...	18.25	24.25	....	....	....	....
Nickel.	27.50	34.50	31.50 41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	115.00
Monel .	29.00	37.00	26.50 33.50	....	....	83.00
Copper*	....	....	20.35† 24.95†	....	....	....

* Deoxidized. † 16.85c for hot-rolled. ‡ 21.70c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville L7; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam..	27
⅝-in. & ⅝-in.	29
¾-in. and larger	26
Longer than 6 in.:	
All diams.	22
Lag bolts, all diams.:	
6 in. and shorter	30
over 6 in. long	28
Ribbed Necked Carriage.	26
Blank	40
Plow	40
Step, Elevator, Tap, and Sleigh Shoe	28
Tire bolts	20
Boiler & Fitting-Up bolts	37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ⅝-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger.....	16	
H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅝-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
⅝-in. & ⅝-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in. & larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	63.5 & 10
Plated finishes ...	50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in. ..	50
¾-in. through 1 in. ..	43
Longer than 6 in.:	
¼-in. through ⅝-in...	33
¾-in. through 1 in...	13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	46
1 in. and smaller diam. x over 6 in.	33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	41
¼-in. diam. & larger	24
N.F. thread, all diams. .	18

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.25c

⅞-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches— Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5½	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge,Pa., sheets A4

Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.

Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.

Detroit, strip, except Type 309 M1.

Dunkirk,N.Y. bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Harrison, N. J., Types 302, 304, 316 wire and strip D6.

Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.

McKeesport, Pa., bars; sheets except Type 416, C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.

So. Chicago, Ill., bars & structurals C3.

Syracuse, N. Y., bars wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.

Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.

Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 25.00

Toluol, one deg. .18.25-25.75

Industrial xylol ..19.75-27.50

Per ton bulk, ovens

Sulphate of ammonia .$32-45

Cents per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.50

Do., less than carlots..14.25

Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.ob. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.l.f. New York, in bags....7.40-8.50	
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots..27.25-29.25	
Copper:	
Electrolytic 28.75-31.50	
Reduced	29.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed ..	66.00
Nickel-Silver, 10-ton lots 36.25	
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	90.50
Zinc, 10-ton lots..18.00-25.50	
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed, 1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb..	2.75
82-88%, freight allowed. 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur.	.$14.00-14.50
Connellsvll,fdry.	.15.00-16.00
New River, foundry	...19.00
Wise county, foundry	..15.95
Wise county, furnace	..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	.$22.00
Everett, Mass., ovens New England, del.‡	23.40
Chicago, ovens	.21.00
Chicago del.	†22.45
Detroit, del.	.24.91
Terre Haute, ovens....	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	20.75
Chicago, del.	.24.12
Cincinnati, del.	23.67
Detroit, del.	.24.65
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painesville, O., ovens..	21.90
Buffalo, del.	.24.02
Cleveland, del.	.23.62
Erie, del.	.22.04
Birmingham, ovens	19.15
Birmingham, del. ...	20.20
Philadelphia, ovens ...	21.25
Neville Island,Pa.,ovens	21.00
Swedeland, Pa., ovens.	21.20
Portsmouth, O., ovens..	20.15
Cincinnati, del.	22.71
Detroit, ovens	.21.65
Detroit, del.	.22.65
Buffalo, del.	.24.00
Flint, del.	.24.09
Pontiac, del.	.23.04
Saginaw, del.	.24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

UNIVERSITY OF MICHIGAN LIBRARIES

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.30	6.04	...	5.95	6.64	8.60	5.85	6.10	7.54
New York(c'try)	5.55	6.64	7.10	5.84	...	5.75	6.44	8.40	5.65	5.90	7.34
Boston (city) ..	5.95	6.75	7.27	5.90	...	5.80	6.39	8.70	5.95	6.28	7.48
Boston (c'try) .	5.75	6.55	7.07	5.70	...	5.60	6.19	8.50	5.75	6.08	7.28
Phila. (city) ..	6.45	6.60	7.10	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.85	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.35	6.59	6.66	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.46	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va....	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va..	5.35	...	6.90	5.63	...	5.53	6.30	...	5.63	5.45	7.13
Wash. (w'hse).	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††[8]	5.55	5.85	7.15
Buffalo (w'hse)	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††[8]	5.35	5.65	6.95
Pitts.(W'hse) ..	5.15	5.95*	6.60-6.70	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††[8]	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.50	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse).	5.15	5.95	7.30	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city) ..	5.57	6.14	6.49	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	7.05	5.30	...	5.30	5.85	9.75††[8]	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.85	5.10	...	5.10	5.65	9.55††[8]	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	6.94	5.44	...	5.44	6.09	9.89††[8]	5.59	5.74	6.94
Milwau. (c'try).	5.29	6.09	7.14	5.24	...	5.24	5.89	9.69††[8]	5.39	5.54	6.74
St. Louis (del.).	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[8]	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[8]	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[2]	5.25	...	5.25	6.88	...	5.40	5.55	7.83
Birm'hm(w'hse)	5.15	5.95	6.15[2]	5.10	...	5.10	...	...	5.25	5.40	...
Los Ang. (city)	6.10	7.65	7.70[3]	6.15	8.30	6.00	7.75	...	6.10	6.00	8.40
L. A. (w'hse)..	5.90	7.45	7.50[3]	5.95	8.10	5.80	7.55	...	5.90	5.80	8.20
San Francisco .	6.25[9]	7.60[3]	7.50[3]	6.75[9]	8.25[3]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross tons lots, packed, $199; less gross ton lot, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(Please turn to page 147)

Copper, Zinc Inquiry Still Heavy

Consumers continue to press for addtional tonnages following advances to 22.50c for copper and to 14.50c for zinc. All mine producers are well sold through July

New York—Consumers of copper and zinc continue to press for tonnages. Advances of 2 cents a pound on copper to 22.50c, Connecticut, and of 1½ cents a pound on zinc to 14.50c, E. St. Louis, have failed to ease the pressure on suppliers for additional tonnages. All copper mine producers have disposed of their prospective supplies through July, while custom smelters are disposing of only enough tonnages daily to balance their current intake.

Custom smelters advanced their buying prices for red metal scrap to 18.75c in an effort to stimulate the movement of material and, when this failed, subsequently advanced prices another ¼-cent to 19.00c for No. 1 copper wire. Receipts at the higher level are still inadequate to cover inquiry for refined metal.

Following the advance in the primary copper market, allied product prices advanced proportionately. Producers of rolled zinc also advanced their prices in line with the rise in slab zinc.

For export, the price of prime western zinc in now 14.00c, f.a.s. Gulf ports. One steel mill purchased close to 100 tons of Belgian prime western grade at 15.25c, c.i.f. New York, which makes the cost to the buyer 16.125c, New York, including duty. On the basis of 14.50c, E. St. Louis, for prime western, the equivalent New York price is 15.22c per pound.

Tin Moves Slightly Higher

New York—Although world production of tin is in excess of requirements, prices are moving gradually higher as part of the upward trend in raw materials. Straits tin for delivery through July is quoted around 78.62½c a pound compared with an average of 77.50c for May. Buying is slower with larger consumers in the steel industry well covered on nearby needs.

Lead Prices Hold Steady

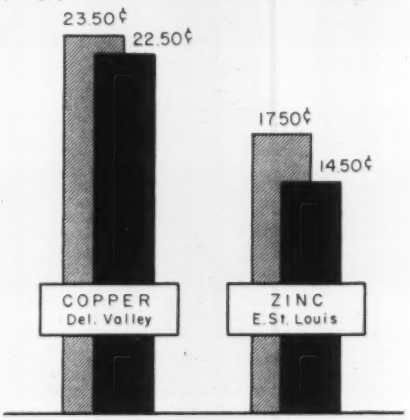
New York—Satisfactory volume of business is being transacted in the lead market, maintaining prices on a firm basis at 11.80c, St. Louis. The advances in copper and zinc, accompanied by a rush of inquiry, has not stimulated activity in lead. Supply of battery plates has tightened slightly, however, indicating that they are held speculatively in some quarters.

Magnesium Prices Advance

Midland, Mich.—Dow Chemical Co. has increased the price of commercially pure magnesium ingots 1 cent a pound and the base price of all standard magnesium alloy ingots 1.5 cents a pound, effective as of June 1. Base prices of pure magnesium sticks and turnings are increased 1.5 cents a pound.

Standard ingots are now quoted 21.50c a pound, f.o.b. Freeport, Tex. The open market on extruded magnesium rounds, 12 in. long, 1.31 in. in diameter, is quoted 55.00c to 57.50c for less than 25 lb, 45.00c to 47.50c for 25 to 99 lb, and 37.50c to 38.00c for 100 lb to 5000 lb.

Copper, Zinc Prices Approach Postwar Highs



Seeks Tariff Protection

Washington—Problems of the zinc industry should be made the subject of a special study so that adequate tariff protection may be granted, says Ernest V. Gent, executive vice president, American Zinc Institute Inc., New York. He recommends that in the meantime no further reductions shall be made in the duties of any of the zinc schedules listed as subject to concessions in forthcoming Torquay negotiations.

In his appearance before the Committee for Reciprocity Information, Mr. Gent said that the Institute's brief filed with the Committee did not represent the views of American Metal Co. Ltd. nor those of the National Zinc Co. He also stated that neither the Anaconda Copper Mining Co. nor the American Smelting & Refining Co. have taken a position in the matter and, therefore, are to be considered neutrals on the tariff questions involved.

The Tri-State Zinc & Lead Ore Association, Picher, Okla., gives full endorsement and approval of the Institute's position. The Association claims that great damage has been done to the zinc industry by foreign importations and that the future competitive foreign imports under low tariff importations will further cripple the ability of the mining industry to expand facilities for increased production.

Output Cut — Low metal prices have drastically reduced output in the Tri-State district, amounting to 42 per cent in April, 1950, compared with the like 1949 month. In the same period, the labor force has been reduced 63.6 per cent, the Association pointed out.

'Without the assurance of long-term protection from foreign zinc, this district cannot see sufficiently high prices to enable it to carry out the long range planning for exploration and development so necessary to maintain steady production," the Association said.

The increasing volume of imports has closed down many of our mines and more shutdowns will inevitably follow, the Institute warns. "The United States mines cannot hope to compete with the lower labor costs, more favorable tax treatment, and much richer ore bodies abroad," the Institute said. "A study of average labor costs in lead and zinc mines in 1948 showed an increase of 135 per cent over 1939 costs. The average increase in supply costs was 113 per cent. Overall costs in domestic mining have increased from a minimum of 30 per cent to a maximum of 70 per cent above the costs that prevailed at the end of World War II. Compensating import duties are essential to offset foreign competition."

Aluminum Output Holds Steady

New York—Production of primary aluminum in April held close to the peak figures of March, 1950, highest since the end of the war, Donald M. White, secretary, Aluminum Association, reports. Production during April, a shorter month, was 116,048,542 lb compared with 117,493,525 lb for March.

A sharper drop in shipments of aluminum sheet, strip and plate by members of the Association from 111,558,806 lb in March to 90,816,431 lb in April is reported. However, the April shipments were larger than for any other month since April, 1949, except March, 1950.

To Study American Techniques

Washington — Techniques practiced in the American nonferrous metals industry will be studied by a British group under a Marshall Plan project, reports the Economic Cooperation Administration. The 17-man British productivity team is due in this country June 14

During a six-month study, the British team will visit plants manufacturing products similar to those produced by the British nonferrous metals industry. These include copper-base alloy extruded products; high conductivity copper and copper alloy products; nonelectrical copper wire, strip and rod products; rolled metal products; and tubes.

The team's study is being made under an ECA technical assistance project, with sponsorship of Anglo-American Council on Productivity.

The team is divided into three groups: Supervisory, technical and operative. William Frederick Brazener, managing director of the Mint, Birmingham Ltd., Birmingham, is the team's leader. The team's secretary is Arthur Leslie Molineux, assistant managing director, Winfields Rolling Mills Ltd., Birmingham.

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NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 22.50c, Conn. Valley; Lake 22.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 21.75-22.00c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.50c; No. 1 yellow (No. 405) 18.25-19.00c.

Zinc: Prime western 14.50c; brass special 14.75c; intermediate 15.00c, East St. Louis; high grade 15.60c, delivered.

Lead: Common 11.80c; chemical 11.90c; corroding 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.50c, pigs 16.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 18.00-18.50c; No. 12 foundry alloy (No. 2 grade) 17.50-17.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.50-18.75c; grade 2, 17.50-18.25c, grade 3, 17.00c; grade 4, 16.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 21.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt, June and July del 78.62½c; Aug. del. 78.50.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.

Mercury: Open market, spot, New York $70-$73 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 22.50-cent copper.)

Sheet: Copper 37.43; yellow brass 34.20; commercial bronze, 95%, 37.38; 90%, 36.93; red brass, 85% 35.96; 80%, 35.52; best quality, 35.60; nickel silver, 18%, 48.39; phosphor-bronze, grade A, 5% 55.21.

Rods: Copper, hot-rolled 33.28; cold-drawn 34.53; yellow brass free cutting, 28.54; commercial bronze, 95% 37.07; 90% 36.62; red brass 85% 35.65; 80% 35.21.

Seamless Tubing: Copper 37.47; yellow brass 37.21; commercial bronze 90% 39.59; red brass 85% 38.87; 80% 38.43.

Wire: Yellow brass 34.49; commercial bronze, 95% 37.67; 90% 37.22; red brass, 85% 36.25; 80% 35.81; best quality brass 35.89.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 26.67, l.c.l. 27.17, 100,000 lb lots 26.545; weatherproof, f.o.b. eastern mills, c.l. 28.10, l.c.l. 28.60, 100,000 lb lots 27.85; magnet, del., 15,000 lb or more 32.50, l.c.l. 33.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	...	...
0.135-0.096	12-48	27.9	...	...
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	——Hexagonal—— 17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....
2.125-2.500	33.0	....	....
2.625-3.375	32.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 20.25c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 18.50c; over 12-in., 19.50c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 75.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 53.00c. Strip, cold-rolled, 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb. 55.00-57.50c; 25 to 99 lb. 45.00-47.50c; 100 lb to 5000 lb, 37.50-38.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 32.09c; oval 31.59; cast 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 46.50c, under 1000 lb 48.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 94.00c, 500 to 999 lb, 94.5c; 200 to 499 lb, 95.00c; less than 200 lb, 96.5c, ball, 1000 lb and over, 96.25c; 500 to 999 lb, 96.75c; 200 to 499 lb 97.25c; less than 200 lb, 98.75c, f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.7c, 100 or 300 lb drums only, 100 to 500 lb, 51.4c; 600 to 1900 lb, 49c; 2000 to 9900 lb, 47.3c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 42.00c, 10 or more drums 40.00c, f.o.b. Niagara Falls, N. Y.; 43.25c and 41.25c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 85.70; more than 2000 lb, 83.70c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 72.29c; 100 lb kegs 73.29c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Heavy Clean	Ends Rod	Turnings Clean
Copper	19.50	19.50	18.75
Yellow Brass	16.75	16.50	15.50
Commercial Bronze			
95%	18.50	18.25	17.75
90%	18.375	18.125	17.625
Red brass			
85%	18.125	17.875	17.375
80%	17.875	17.625	17.125

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 19.00; No. 2 copper 18.00; light copper 17.00; composition red brass 16.50; radiators 13.50; heavy yellow brass 12.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.00; No. 2 copper 18.00; light copper 17.00; refinery brass (60% copper) per dry copper content 17.25.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 16.25-16.50; No. 2 14.75-15.00; light copper 13.75-14.00; No. 1 composition red brass 13.00-13.25; No. 1 composition turnings 12.50-12.75; mixed brass turnings 8.00-8.25; new brass clippings 12.50-13.00; No. 1 brass rod turnings 11.00-11.50; light brass 7.75-8.00; heavy yellow brass 8.75-9.00; new brass rod ends 11.25-11.75; auto radiators, unsweated 9.75-11.00; cocks and faucets, 10.75-11.00; brass pipe 11.25-11.50.

Lead: Heavy 9.50-9.75; battery plates 5.25-5.50; linotype and stereotype 11.50-11.75; electrotype 9.75-10.00; mixed babbitt 9.75-10.00.

Zinc: Old zinc 6.75-7.00; new die cast scrap 7.00-7.25; old die cast scrap 5.00-5.25.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 11.00-11.50; old sheets 8.00-8.50; crankcase 8.00-8.50; borings and turnings 5.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
June 8	22.50	11.80	14.50	78.625	17.50	24.50	48.00	72.75
June 7	22.50	11.80	14.50	78.375	17.50	24.50	48.00	72.75
June 6	22.50	11.80	14.50	78.00	17.50	24.50	48.00	72.75
June 5	20.50-22.50	11.80	14.50	78.00	17.50	24.50	48.00	72.75
June 2-3	20.50	11.80	14.50	78.125	17.50	24.50	48.00	72.75
June 1	20.50	11.80	13.00	77.875	17.50	24.50	48.00	72.75
May Avg.	19.962	11.521	11.990	77.500	17.192	24.50	40.308	72.635
May 31	20.50	11.80	13.00	78.00	17.50	24.50	48.00	72.75
May 29	20.50	11.80	13.00	78.125	17.50	24.50	40.00	72.75
May 26-27	20.50	11.80	12.50	78.00	17.50	24.50	40.00	72.75
May 25	20.50	11.80	12.50	78.25	17.50	24.50	40.00	72.75
May 24	20.50	11.80	12.50	78.50	17.50	24.50	40.00	72.75
May 23	20.50	11.80	12.00	78.375	17.50	24.50	40.00	72.75
May 22	20.50	11.80	12.00	78.25	17.50	24.50	40.00	72.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, June 8, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 8	$40.83
June 1	37.17
May 1950	33.82
June 1949	20.85
June 1945	19.07

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$46.00*
No. 2 Heavy Melt.	*39.00*
No. 1 Busheling	*46.00*
No. 1 Bundles	*46.00-48.00*
No. 2 Bundles	*37.00*
Heavy Turnings	36.00-37.00
Machine Shop Turnings	30.00-31.00†
Mixed Borings, Turnings	30.00-31.00†
Short Shovel Turnings	33.50-34.50
Cast Iron Borings	29.50-30.50
Low Phos. Steel	*46.50-47.00*

Cast Iron Grades

No. 1 Cupola Cast	**37.00-38.00**
No. 1 Machinery Cast	**41.00-42.00**
Charging Box Cast	**37.00-38.00**
Heavy Breakable Cast	**33.50-34.50**

Railroad Scrap*

No. 1 R.R. Heavy Melt	*47.00*
Rails, Random Lengths	*45.00-46.00*
Rails, 2 ft. and under	*46.50-47.00*
Rails, 18 in. and under	*47.50-48.50*
Railroad Specialties	*50.00-51.00*
Axles	*45.00-46.00*
Angles, Splice Bars	*46.00-47.00*

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$42.50-43.00
No. 2 Heavy Melt. Steel	37.50-38.00
No. 1 Busheling	42.50-43.00
No. 1 Bundles	42.50-43.00
No. 2 Bundles	31.50-32.00
Machine Shop Turnings	27.00-27.50
Mixed Borings, Turnings	29.50-30.00
Short Shovel Turnings	29.50-30.00
Cast Iron Borings	29.50-30.00
Low Phos.	43.50-44.00

Cast Iron Grades

No. 1 Cupola	49.00-50.00
Charging Box Cast	45.00-46.00
Stove Plate	44.00-45.00
Heavy Breakable Cast	40.00-42.00
Unstripped Motor Blocks	35.00-36.00
Brake Shoes	37.00-38.00
Clean Auto Cast	49.00-50.00
No. 1 Wheels	45.00-46.00
Burnt Cast	39.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.50-43.00
R.R. Malleable	49.00-50.00
Rails, 3 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, Random Lengths	49.00-50.00
Cast Steel	42.50-43.00
Railroad Specialties	43.50-44.00
Uncut Tires	49.00-50.00
Angles, Splice Bars	51.00-51.50

VALLEY

No. 1 Heavy Melt. Steel	$44.50-45.00
No. 2 Heavy Melt. Steel	39.50-40.00
No. 1 Bundles	44.50-45.00
No. 2 Bundles	33.50-34.00
Machine Shop Turnings	29.00-29.50
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00
Low Phos.	45.50-46.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	44.50-45.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$36.00-37.00**
No. 2 Heavy Melt. Steel	*33.00-34.00**
No. 1 Busheling	*35.00-36.00**
No. 1 Bundles	*36.00-37.00**
No. 2 Bundles	*30.50-31.00**
Machine Shop Turnings	*25.00-26.00**
Short Shovel Turnings	*27.50**
Mixed Borings, Turnings	*24.00**
Low Phos. Punchings and Plate, elec. fur. grade	*41.00**
Low Phos. Plate, 5 ft & Under	*41.00**
Elec. Furnace Bundles	*37.00**
Heavy Turnings	*37.00-38.00**
No. 1 Chemical Borings	*Nominal*
Knuckles and couplers	*39.00-40.00**
Steel car wheels	*39.00-40.00**

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
No. 1 Machinery Cast	39.00-40.00
No. 1 Yard Cast	34.00-35.00
Charging Box Cast	36.00-37.00
Heavy Breakable Cast	36.00-37.00
Unstripped Motor Blocks	29.00
Clean Auto Cast	39.00-40.00
No. 1 Wheels	41.00-42.00
Malleable	45.00-46.00

CINCINNATI

No. 1 Heavy Melt. Steel	*$38.00*
No. 2 Heavy Melt. Steel	*33.00*
No. 1 Busheling	*38.00*
No. 1 Bundles	*38.00*
No. 2 Black Bundles	*32.00*
No. 3 Bundles	*27.00*
Machine Shop Turnings	21.00
Short Shovel Turnings	24.00
Mixed Borings, Turnings	23.00
Cast Iron Borings	24.00

Cast Iron Grades

No. 1 Cupola Cast	46.50
Charging Box Cast	*38.00*
Stove Plate	33.00
Heavy Breakable Cast	40.00
Unstripped Motor Blocks	*29.00*
Brake Shoes	*28.00*
Clean Auto Cast	46.50
Drop Broken Cast	48.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*40.00*
R.R. Malleable	*44.00*
Rails, Rerolling	*46.00*
Rails, Random Lengths	42.00
Rails, 18 in. and under	50.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$29.00-30.00
No. 1 Bundles	41.00-42.00
No. 2 Bundles	27.50-28.00
No. 1 Busheling	40.50-41.00
Machine Shop Turnings	24.50-25.00
Forge Flashings	40.50-41.00
Short Shovel Turnings	26.50-27.00
Cast Iron Borings	26.50-27.00
Punchings & Plate Scrap	40.50-41.00

Cast Iron Grades

No. 1 Cupola Cast	*40.00-41.00*
Heavy Breakable Cast	*35.00-36.00*
Clean Auto Cast	*44.00-45.00*

BUFFALO

No. 1 Heavy Melt. Steel	*$41.50-42.50*
No. 2 Heavy Melt. Steel	*38.50-39.00*
No. 1 Busheling	*38.50-39.00*
No. 1 Bundles	*39.50-40.00*
No. 2 Bundles	*36.50-37.00*
Machine Shop Turnings	*32.50-33.00*
Mixed Borings, Turnings	*32.50-33.00*
Cast Iron Borings	*32.50-33.00*
Short Shovelings	*34.50-35.00*
Low Phos.	*44.50-45.00*

Cast Iron Grades

No. 1 Machinery	*40.50-41.00*
No. 1 Cupola	*37.50-38.00*
Stove Plate	*38.00-39.00*
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under	*48.50-49.00*
Rails, random size	*42.50-43.00*

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$31.00-31.50
No. 2 Heavy Melt. Steel	*29.00-30.00*
No. 1 Busheling	*34.00-35.00*
No. 1 Bundles	*35.00-36.00*
No. 2 Bundles	*27.50-28.00*
Machine Shop Turnings	*21.00-21.50*
Mixed Borings, Turnings	*21.00-21.50*
Short Shovel Turnings	*23.00-23.50*
Punchings & Plate Scrap	*36.00-37.00*
Low Phos. Plate, 5 ft & under	*36.00-37.00*
Elec. Furnace Bundles	*33.00*

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery	30.00-31.00
Charging Box Cast	30.00-31.50
Heavy Breakable	30.00-31.50
Unstripped Motor Blocks	23.00-23.50
Malleable	36.50

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$35.00-36.00*
No. 2 Heavy Melt. Steel	*27.00-28.00*
No. 1 Bundles	*35.00-36.00*
No. 1 Busheling	*34.00-35.00*
Machine Shop Turnings	*22.00-22.50*
Mixed Borings, Turnings	*22.00-22.50*
Short Shovel Turnings	*24.00-24.50*
Bar Crops and Plate	*37.00-38.00*
Punchings & Plate Scrap	*37.00-38.00*
Chemical Borings	*22.50-23.00*

Cast Iron Grades

No. 1 Cupola Cast	*33.00-34.00*
Mixed Cast	*29.00-30.00*
Heavy Breakable Cast	*31.00-32.00*
Stove Plate	26.00-27.00

CHICAGO

No. 1 Heavy Melt. Steel	*$40.00*
No. 2 Heavy Melt. Steel	*38.00*
No. 1 Bundles	*40.00*
No. 2 Bundles	36.00
Machine Shop Turnings	*26.00-26.50*
Mixed Borings, Turnings	*26.00-26.50*
Short Shovel Turnings	*28.00-29.00*
Cast Iron Borings	27.00-28.00
Low Phos.	40.00-41.00
Elec. Furnace Bundles	*38.00-39.00*
Heavy Turnings	30.00-31.00
Cut Structurals	*38.00-39.00*

Cast Iron Grades

No. 1 Cupola Cast	47.00-50.00
Clean Auto Cast	49.00-50.00
No. 1 Wheels	38.00-39.00
Stove Plate	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*41.00-42.00*
Malleable	44.00-45.00
Rails, Rerolling	52.00-53.00
Rails, Random Lengths	43.00-44.00
Rails, 2 ft and under	47.00-48.00
Rails, 18 in. and under	48.00-49.00
Railroad Specialties	40.00-41.00
Angles, Splice Bars	43.50-44.50

BIRMINGHAM

No. 1 Heavy Melt. Steel	*$31.00-32.00*
No. 2 Heavy Melt. Steel	*29.00-30.00*
No. 1 Busheling	*29.00-30.00*
No. 2 Bundles	*27.00-28.00*
Machine Shop Turnings	*25.00-26.00*
Mixed Borings, Turnings	*26.00*
Short Shovel Turnings	*27.00-28.00*
Cast Iron Borings	*24.00-25.00*
Bar Crops and Plate	*37.00-38.00*
Cut Structurals	*36.00-37.00*

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
Stove Plate	*32.00-33.00*
No. 1 Wheels	*33.00-34.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*35.00*
R.R. Malleable	nominal
Rails, Rerolling	*44.00-45.00*
Rails, 3 ft and under	*nominal*
Angles and Splice Bars	*39.00-40.00*

ST. LOUIS

No. 1 Heavy Melt. Steel	*$36.00-37.00*
No. 2 Heavy Melt. Steel	*31.50-33.50*
No. 1 Bundles	*36.00-37.00*
No. 2 Bundles	*31.50-33.50*
No. 3 Bundles	*29.00-30.00*
Machine Shop Turnings	*23.00-24.00*
Short Shovel Turnings	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-41.00
Charging Box Cast	*36.00-37.00*
Heavy Breakable Cast	*38.00-39.00*
Brake Shoes	*35.00-36.00*
Clean Auto Cast	*40.00-42.00*
Burnt Cast	*35.00-36.00*

Railroad Scrap

R.R. Malleable	*39.00-42.00*
Rails, Rerolling	50.00-52.00
Rails, Random Lengths	*40.00-42.00*
Rails, 3 ft and under	*46.00-48.00*
Uncut Tires	*40.00-41.00*
Angles, Splice Bars	*42.00-43.00*
Railroad Specialties	*42.00-44.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	12.00
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50-30.00
Cut Structurals	27.50-30.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	25.00
Stove Plate	25.00
Unstripped Motor Blocks	23.00
Malleable	25.00
Brake Shoes	23.00
Clean Auto Cast	25.00-30.00
No. 1 Wheels	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	30.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	30.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	*$30.00*
No. 1 Bundles	*30.00*
Mechanical Bundles	*28.00*
Mixed Steel Scrap	*28.00*
Mixed Borings, Turnings	*23.00*
Rails, Remelting	*30.00*
Rails, Rerolling	*33.00*
Busheling	*24.50*
Bushelings new factory, prep'd	*28.00*
Bushelings new factory, unprep'd	*23.00*
Short Steel Turnings	*23.00*

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

UNIVERSITY OF MICHIGAN LIBRARIES

Sheets Strip . . .

Sheet and Strip Prices, Page 129 & 130

Boston—In their attempts to place additional flat-rolled tonnage consumers, less price minded, are trying to break in on more distant mill schedules. To obtain coverage they are willing to pay higher freight. Meanwhile, pressure for shipment is strong. Deliveries are substantial and under normal conditions would be ample.

New York—More sheet producers appear out of the market than in, due to the heavy overloading of bookings. None has officially opened books for fourth quarter, although there is no question a sizable amount scheduled for the preceding period will be carried into the final three months. Some, operating on a monthly allocation plan, have not allocated tonnage for September, but even they fear their arrearages will take up a portion of their schedule for that month and are planning on restricting allocation of their regular customers even more than in the past, to say nothing of not taking business from new buyers.

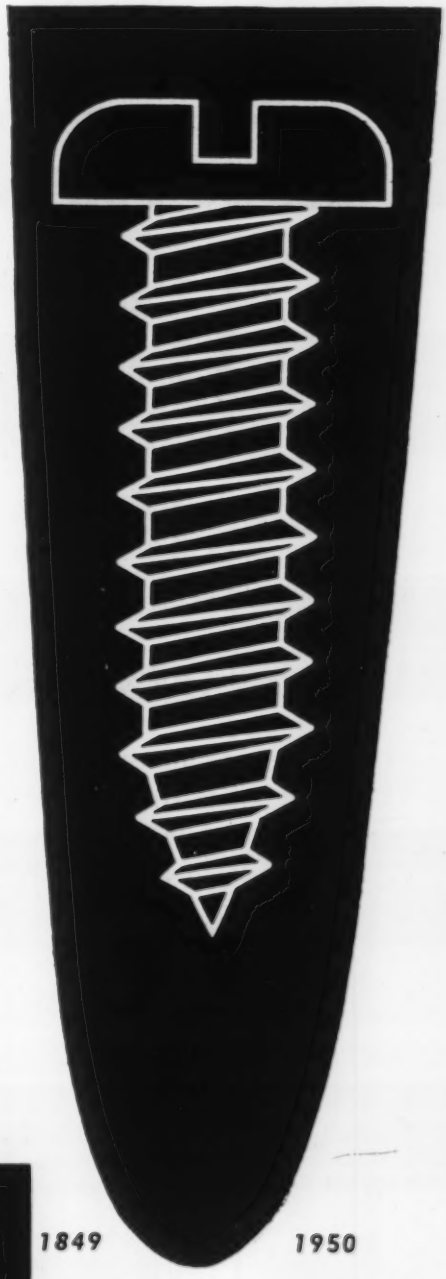
Philadelphia—Despite stringency in sheets, producers have not yet opened books for fourth quarter. Some sheet sellers, who are allocating month-to-month, have not made September allocations.

Pittsburgh—Consumers of galvanized sheets will have to pay an average of $2.40 more per ton (due to recent 1½-cent advance in zinc) based on automatic adjustment in coating extras which are related to zinc prices. Major sheet and strip consumer groups report output is retarded by lack of steel. There is little evidence pressure for deliveries will ease over coming months based on projected production schedules. Nonintegrated interests are operating between 80 to 90 per cent of capacity, in some instances at a lower rate, due to inadequate stocks. Some producers have been forced to advance prices because of the necessity to supplement steel supply at considerably higher prices from other than regular sources.

Sharon Steel Corp., Sharon Pa., effective June 5, advanced hot-rolled sheets $3 per ton; hot-rolled strip, $5; cold-rolled strip, $7; and tight cooperage hoop, $5. New price levels on above products are $3.50 per 100 pounds for hot-rolled sheets and strip; $4.50 on cold-rolled strip; and $3.65 on tight cooperage hoop. Sharp increase in raw material costs was major factor in the advances.

Blair Strip Steel Co., New Castle, Pa., advanced cold-rolled strip $7 a ton to $4.50 per 100-pound base. Nonintegrated cold-rolled strip producers may have to advance prices, if the increase in hot-rolled sheets and strip spreads throughout the industry.

Cleveland—No letup in demand for sheets is sighted. Automotive and home appliance requirements appear insatiable. With order backlogs carrying into fourth quarter, sheetmakers are turning away new tonnage, anticipating no early openings in rolling schedules. As a result, considerable business is being diverted to the conversion and premium mar-



tapping screws—
just one of our
star performers!

BLAKE & JOHNSON
Fastenings

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kets. Indicative of the tight supply, consumers are ordering no shipments be held up during vactions.

The most significant development in the market pricewise last week was the action of Sharon Steel Corp. in raising its published f.o.b. quotations $3 per ton on hot-rolled sheets, $5 on hot rolled strip, $7 on cold-rolled strip, and $5 on tight cooperage hoop. Whether other makers will follow is uncertain. In recent weeks several smaller producers have raised their prices.

Passage by the Senate of the much-disputed freight absorption bill holds long-term implications in the market, assuming the measure is aproved by President Truman. Little resort to freight absorption is likely in the present scarcity market, however.

Cincinnati — Despite approach of vacation periods, no weak spot in demand for sheets has appeared.

Chicago—Chicago mills show no disposition to make any price changes soon. Nonintegrated interests here are being taken care of reasonably well by their slab suppliers. With little necessity for paying premium prices for semifinished, they do not expect to make price changes unless their materials costs are advanced.

Three important producers of refrigerators and ranges have had to curtail output for lack of sheets. Other users who are hard put to maintain production include implement makers, miscellaneous stampers and automotive suppliers.

Los Angeles—Fabricators' needs for flat-rolled is urgent, but they are resisting premium-priced offerings. Extreme consumer pressure is leaving producers without excess finishing capacity, and no conversion business is being done in the district.

Plates . . .

Plate Prices, Page 129

Boston—Plate deliveries are lengthening, large diameter pipe and freight car demand taking a generous slice of overall production. Bulk of orders is for light gage material. Small tank requirements exceed earlier estimates. Miscellaneous industrial demand is active and more consumers seek to build better balanced inventories.

New York—Stringency in plates is becoming more pronounced in the East. One eastern producer is out of the market for entire third quarter on sheared plate, as well as one leading Pittsburgh mill which normally is an active seller in this district. Certain other producers are offering nothing for delivery for the next four months on smaller thicknesses—anything under ½ in. Meanwhile, their promises on the heavier gages are more extended, around 10 to 12 weeks.

Philadelphia—August appears the best delivery that can be done on plates, and then only on heavier gages. Most producers are virtually covered for the entire third quarter on lighter. One district producer will be down at least three weeks in August for mill repairs. Mass vacations will be taken during the first two weeks of this period.

Pittsburgh — Unbalanced demand-supply relationship in plates will be accentuated throughout July because

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of scheduled vacation shutdowns among various mills in this district. Sellers contend tightness in plate supply is nearly comparable to that for sheets and strip, and distribution is expected to remain on an allotment basis through most of the year. Construction of large diameter pipe lines continues to take a major portion of current output, despite improved demand noted from tank and barge fabricators.

Los Angeles—Pressure for plates is increasing. Some fabricators are finding that even favorable positions on allocation lists are not enough to maintain adequate supplies. Deliveries now average 120 days, whereas 75 is considered normal.

Steel Bars . . .

Bar Prices, Page 129

Boston—Bar mill schedules, notably hot-rolled carbon, are so extended producers are reluctant to take on further firm commitments. Cold-finished carbon output is hampered by lack of supply balance. Improvement in general supply is dimmed by the likelihood of mill vacation losses next month though these will be partially offset by vacations at consuming plants.

New York—Some leading sellers of hot carbon bars are accepting tonnage for fourth quarter delivery. This does not necessarily mean they are booked up solidly on all sizes for third quarter. Nevertheless they are substantially booked for that period and find demand steadily expanding. In no case is much tonnage to be had against new orders before September.

Cold finished carbon bars are much affected delivery-wise by this situation. With shipments from hot mills so far extended, cold drawers have little choice but to make extended promises on the processing of such hot carbon tonnage as they have not in stock. Where they have rough stock on hand they can generally promise three to four weeks, but their inventories of this material are shrinking rapidly.

Philadelphia—Hot carbon bar deliveries are expanding rapidly. Most sellers are booked through third quarter. At least two are accepting orders for fourth quarter.

Demand is coming out from a diversity of sources. Particular pressure from cold drawers is noted, these in turn, experiencing a spurt in ordnance demand and reporting shrinkage in hot stock inventories. Hot mills report improved demand from heavy forgers. Railroad requirements are adding to the pressure.

Pittsburgh—Cold finishers' production schedules are below 90 per cent of capacity in many instances due to inadequate stocks of hot-rolled carbon and alloy material. Pressure for delivery from all consumer groups of hot and cold-finished bars is increasing. Automotive industry continues major outlet and there is no indication of easing in demand from this source.

Cleveland—Hot-carbon bar buyers are encountering increasing difficulty in satisfying their requirements. Mill deliveries have been lengthening steadily and now extend far into third quarter. Cold-finished bar supply also

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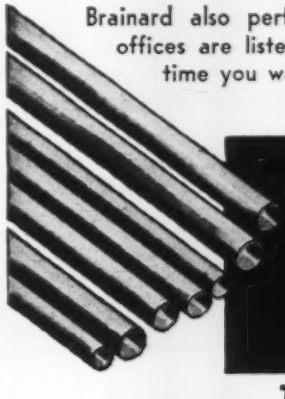

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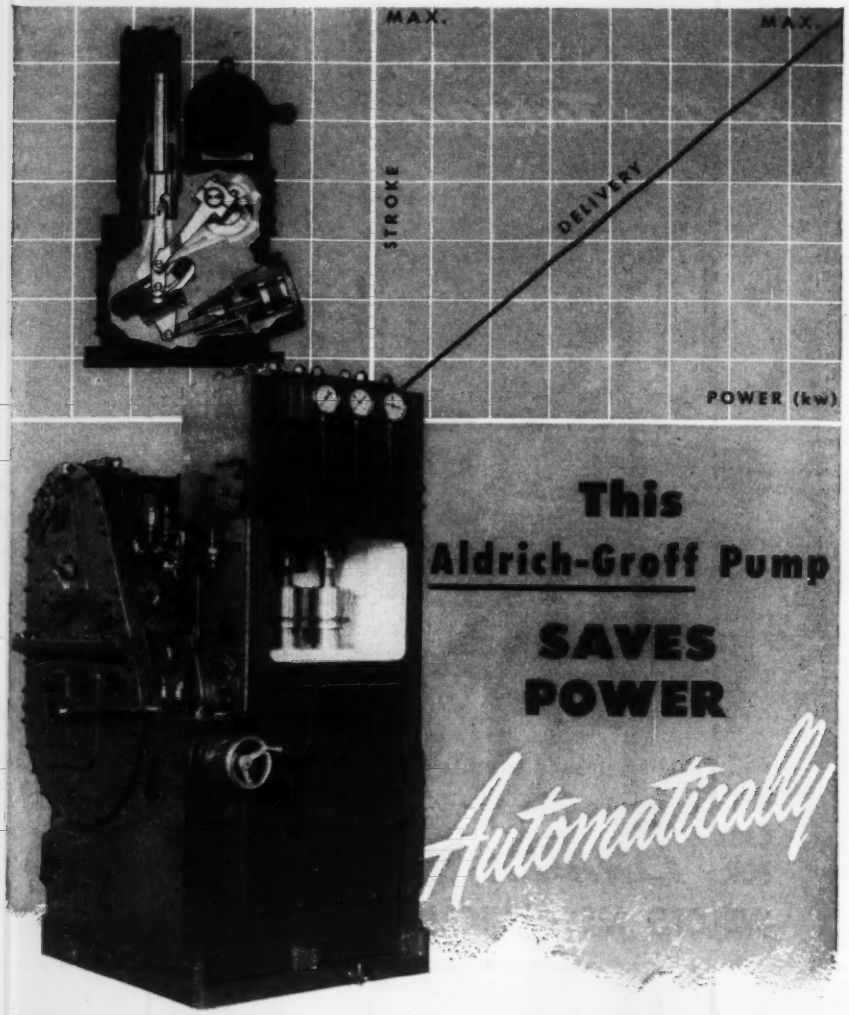

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is tight with cold finishers unable to obtain prompt shipments of hot bars for processing.

Chicago — Cold-drawers report no change in price structure. Some admit their operations are kept below capacity for lack of hot bars. Carbon bars are in strong demand, although tension among users over supply has lessened.

One rerolling mill is considering tying its prices to the price of rerolling rails.

Export Steel Prices Revised

New York—United States Steel Export Co., this city, has revised downward its price schedule for certain products. Prices include freight to New York, Philadelphia, or Baltimore and are subject to adjustment to seller's price in effect at time of shipment from the mill.

Effective as of May 3, special coated manufacturing ternes, unassorted, 107 lb basis weight, are $7.08 per base box.

Effective as of May 11, prices per 100 lb are: Bright nail wire, $5.02; black annealed wire, $5.62; galvanized plain wire, $5.87; bright nails and staples, $5.84; barbed wire, Glidden, Iowa and Waukegan, 4pt. 3 in. or 6 in., $6.88. Lyman barbed wire 4pt, 5 in. is quoted $5.90 per 80 rod spool.

Effective May 16, tight cooperage hoops are quoted $3.94 per 100 lb.

Wire . . .

Wire Prices, Page 131

Boston—Consumers of wire have better balanced inventories than those of flat-rolled, as mills keep to fairly orderly schedules in meeting delivery. Demand is strong, especially for the automotive trade. Low-carbon grades average six to eight weeks; screw stock is slightly more extended, but consumers have better balanced inventories. Screw production has changed radically in recent years, ratio of smaller sizes being heavier. This in turn has drastically revised wire specifications, involving gages and chemical analysis.

San Francisco—Shipment of 2000 kegs of nails from Germany has been landed here and will be sold through brokers. A ready demand is indicated.

Tin Plate . . .

Tin Plate Prices, Page 130

San Francisco—Shipments of tin plate received by food processors on the West Coast and Hawaii totaled 1,780,000 base boxes in first quarter this year compared with 1,600,000 in the first three months of 1949. Heavier buying has been stimulated by lower prices, although a corollary factor is the prospect of heavier food canning this summer.

Structural Shapes . . .

Structural Shape Prices, Page 129

New York—A heavy amount of bridge work continues to be figured and in the light of public construction now under way and projected, fabricators anticipate active demand

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for some time to come. Actually some look for a good market not only over remainder of this year but throughout next year as well.

Pittsburgh—Keen competition persists despite improved order backlog position, in range of 6 to 10 weeks, among structural fabricators. Most new inquiries originate from public sources, with bridge work predominating.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Boston—Sustained heavy demand for highway bridges, supplemented by increased requirements for housing projects and air field paving, is draining off available stocks of concrete reinforcing bars. Prices are firmer, reflecting tighter supply and advances in rails for rerolling into bars.

Los Angeles — Record-breaking building activity is helping to keep rolling mills sold out on 30 day schedules. Building valuation in Los Angeles county in May reached $47,415,718, 91.6 per cent higher than the like month last year.

Revises Cooperage Hoop Prices

Atlanta—Atlantic Steel Co. has reduced the f.o.b. mill price of cooperage hoop 20 cents per 100 lb to $3.40, effective June 1. At the same time the company announced a new schedule of prices on high-strength steel products now quoting bars and bar size shapes, $5.35, strip 6 in. and under $5.10, cooperage hoop, $5.10. Extras covering cooperage hoop also were revised.

Semifinished Steel . . .

Semifinished Prices, Page 129

Cleveland—Steel shortage is encouraging an increasing flow of foreign steel to this country. While bulk of it is coming in under domestic price levels along the seaboard some offers are considerably above domestic levels. A broker here has been offered a substantial tonnage of carbon forging ingots at $58 per ton f.a.s. Antwerp, Belgium, the delivered price in the Midwest figuring out around $85 or $90. This compares with domestic published prices of $50 per net ton, mill.

Youngstown—Steelworks are loaded with orders and are running into shortages of semifinished. Ingot production in the area is being pushed

Los Angeles—Steadily increasing pressure for finished steel products has caused Kaiser Steel Corp.'s Fontana ingot production to jump 16 per cent in one week. Still, the shortage of semifinished steel from open hearths and blooming mills is acute and is limiting output of finishing mills.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 132

Cleveland — With foundry operations the best in months oven coke sellers report difficulty meeting all demands. There is no acute shortage, however. Shipments are adequate for stepped-up melting rates. But melt-

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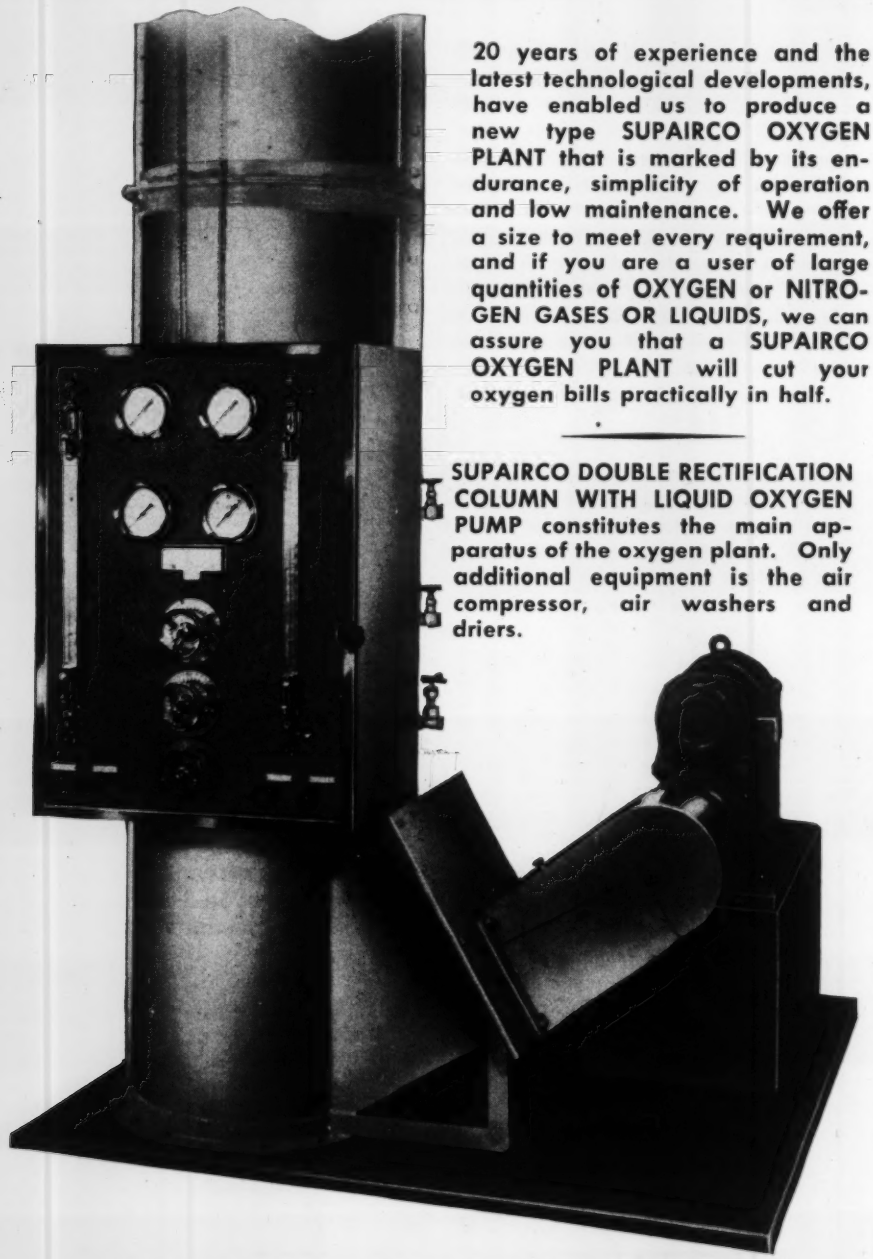

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ers are unable to build as comfortable inventories as they desire. This generates demand pressures that serve to create a scarcity market atmosphere. Recent easiness in coal has not spread to coke. Still, with coal buyers deferring purchases in hope of lower prices, a fall coal supply pinch may be in the making. This is thought possible should the majority of buyers enter the market at about the same time. A supply pinch in coal could at least sympathetically affect the coke market.

Pig Iron . . .

Pig Iron Prices, Page 128

Boston—In two years, 27 foundries have closed in New England, latest being a captive gray iron shop, Stonington, Conn. Most were small producers, but several captive units are included. Larger melters in the textile mill equipment field have greatly increased capacity, several doubling facilities. Lacking outlet to automotive volume, current level of melt is not expected to rise materially until fall. Mystic stack, under reduced draft, is supplying bulk of requirements under contract with an occasional car from Buffalo.

New York—Despite little improvement in foundry operations, pig iron demand is picking up. Higher scrap prices and tighter overall supply situation in domestic pig iron is causing some consumers to anticipate requirements. Also, this combination of circumstances is sharpening interest in foreign iron, prices on which have recently started moving upward. Certain leading importers have increased selling prices $3 and $4 per ton to around $41.00-$42.00, f.o.b. port. This still leaves foreign iron several dollars per ton under domestic levels.

Buffalo—Brisk demand from automotive casters has tightened the pig iron market here. In addition to requirements of local melters heavy shipments of iron are moving out of here by boats for Michigan operators. In view of present demand there is some reluctance to tie up iron in barges for two weeks while enroute to east coast consumers.

Philadelphia—An increasing amount of foreign iron is easing pressure on domestic pig iron producers. District furnaces have no difficulty disposing of their tonnage. Meanwhile prices on imported iron are tending upward. At least one seller advanced prices $3 to $4 a ton to around $41-$42 f.o.b. eastern ports.

Pittsburgh—Captive foundries report continued upward trend in order volume. Improved activity among machine tool builders is a factor in this connection, combined with renewal of freight car buying on moderate scale to date. Production schedules are also tending upward among a few jobbing shops. However, this latter group has not yet experienced marked increase in order volume reported by captive interests.

Cleveland—Increased foundry melt and soaring scrap prices are generating renewed pressure on the merchant pig iron market. Gray iron foundries are operating on the average, at about 70 per cent of effective commercial demand. Both captive and

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jobbing shops are engaged, as a general thing, 5-days weekly. Demand for motor castings is especially pressing. Substantial general business is being entertained also, and more such is in prospect for the next 4 or 5 months. The steel and malleable foundries anticipate large volume demand with railroad car business promising sizable proportions.

Youngstown—Supply of merchant pig iron will be adversely affected by the blowing out of one of the Shenango Furnace Co.'s stacks at Sharpsville, Pa. This stack was taken off because of a breakout. It will be down for a month to six weeks.

Cincinnati—Shipments of pig iron are adequate but furnaces report a tightening in supply.

Birmingham—Pig iron demand is expected to tighten further with settlement of an eight-weeks' old strike of plumbers and steamfitters. The strike had materially slowed construction and was reflected in the pig iron market.

San Francisco—Largest single shipment of European pig iron to reach this area since the war has been unloaded at Oakland. The cargo consisted of 1150 long tons of Dutch-produced iron, loaded at Rotterdam. It was consigned to H. L. E. Meyer Jr. & Co.

Scrap . . .

Scrap Prices, Page 136

Boston—Sharp advance in lighter grades of steel scrap have brought differentials more in line with No. 1 heavy melting, but spread between No. 2 and top grade is around $6 per ton. All steelmaking scrap is higher, No. 1 to basis of $35-$36, shipping point. Slightly higher prices are paid for cast scrap for district delivery, but activity lags behind steel demand and prices find little support for shipment outside this territory.

New York—Brokers' buying prices have moved over the crest, at least for the present. Whereas $37.00 was paid for No. 1 heavy melting steel early in the week, $35-$36 was done later.

Chicago—At least one district mill entered the scrap market late last week paying $40 for No. 1 heavy melting steel, $5 more than the last purchase price. No. 2 heavy melting is quotable at $38, No. 1 bundles at $40, No. 1 railroad heavy melting at $41 to $42. Brokers have been having serious difficulty obtaining the bellwether grade at $38.

Philadelphia—To combat the runaway domestic market, steel scrap consumers are increasing purchases abroad. Bethlehem Steel Co. has bought 80,000 tons from Italy, France and Germany; also a couple of cargoes from the Caribbean area. Part of the European scrap is scheduled to arrive within the next four to six weeks. Negotiations are under way for still more tonnage.

Carnegie-Illinois Steel Corp. has bought no foreign scrap, but is considering the purchase of a sizable tonnage.

While very keen, the edge of the steel scrap market appears slightly off from a few days ago. No. 1 heavy melting steel is nominally $36-$37, delivered. Other grades also

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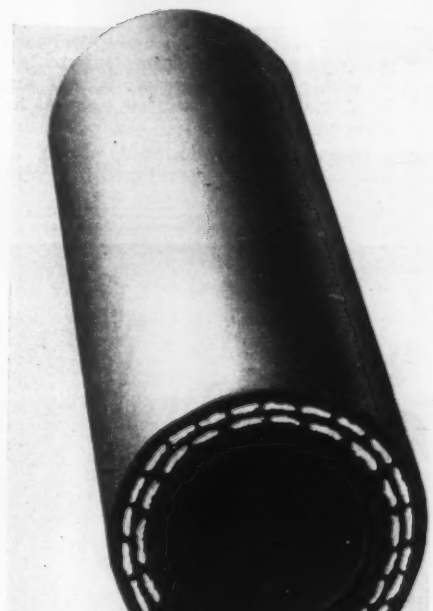

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are higher. Cast scrap prices are unchanged.

Buffalo—Prices on heavy melting, bundles and turnings spurted $5 to $6 a ton on orders totaling around 25,000 tons. In addition, small tonnages were sold to an outside interest. Range on No. 1 heavy melting is $41.50-$42.50. No. 2 heavy melting is purchased at $39, while No. 2 bundles bring $37. Machine shop turnings were included in orders at $33.

Pittsburgh—Sales of No. 1 heavy melting scrap last week at $46 represent a $3 advance to the highest level of the postwar period. Some trade authorities believe corrective measures are in the making and anticipate lower prices on the next large tonnage booked. Considerable more tonnage is being offered by dealers and brokers, indicating this latter group believes the top of the upswing has been reached. Principal consumer soon hopes to conclude negotiations for a large tonnage of European scrap.

Cleveland—Normal reaction to the too-rapid rise in scrap prices set in here last week, creating a lull in activity. Mills made no new purchases, while brokers are attempting to buy at levels $1 under previous bids and have been successful in some instances.

Detroit—A pronounced easing of the scrap market developed last mid-week. Some brokers were inclined to view the shift as possibly the start of a long but gradual decline in prices from their stratospheric levels. Two mills here received scrap on allocation from automotive sources and hence were not interested in buying on the open market. Another electric furnace plant was supplied from tonnage stored by its scrap broker. Steel mills outside this area were backing away from high prices and by Wednesday the market was off $1 a ton on some grades. The final test will come in about two weeks when the next automotive lists are up for bids.

St. Louis—Scrap quotations are sharply higher with at least two large consumers of heavy melting placing orders for 60 to 75 days' supplies. No. 2 melting, the most popular steelmaking grade in this area, went up only 50 cents, but the trend set off a splurge of cast buying by foundries which boosted most cast grades $1 to $4.

Birmingham—This district is experiencing a run-away scrap market, attributed largely to conversion business. Heavy melting is sharply higher at $31. Some local buyers have had to buy remote steel plate.

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Warehouse . . .

Warehouse Prices, Page 133

Boston — Galvanized sheets are quoted $1 ton higher by warehouses. Demand on distributors for flat-rolled, notably cold-rolled sheets, is unfilled due to shortage of steel. With deliveries behind schedule, warehouses are unable to place additional tonnage beyond commitments.

Philadelphia—Warehouse price on 10 gage galvanized sheets has advanced to 7.10c city, and 6.85c country. This is an automatic increase based on the rise in zinc to 14.50c.

Pittsburgh—U. S. Steel Supply Co. raised base prices June 5 as follows: Bars and hot-rolled carbon sheets, $2 per ton; standard shapes, wide flange beams, plain and floor plates, $4; cold-rolled sheets, $3; galvanized sheets $5 on 10 gage base.

Cleveland—Order volume of district warehouses shows no sign of easing off. June business is expected to hold at the high level of May, being limited only by supply shortages of certain products, especially light, flat-rolled items. In recent weeks plates have joined the list of items in tight supply. With the exception of galvanized sheets, distributors' prices are unchanged at levels established several weeks ago. Last week U. S. Steel Supply Co. announced an increase of $6 per ton on No. 10 galvanized sheets to 7.30c warehouse, and 7.50c, Cleveland delivered.

Chicago—Higher warehouse prices are in effect for galvanized sheets, No. 10 being quoted $6.85 per 100 lb; city price is $7.05; Milwaukee price is $6.94, warehouse; $7.14 city.

Los Angeles—Prices on warehouse products are up $1 to $4 per ton. Hot-rolled sheet and strip advanced 10 cents per 100 lbs, 15 cents on cold-rolled sheets, and 20 cents on structurals and floor plates.

Seattle — Warehouses report in-

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creased turnover, due chiefly to seasonal gain in construction. Demand is well spread for all out-of-stock items. Hot and cold-rolled sheets are in short supply with no immediate relief in sight. There is a fair tonnage of galvanized sheets in this area due to accumulations in the early months of the year

Canada . . .

Toronto, Ont. — Canadian steel scrap prices are $3 per ton higher with heavy melting at $30, delivered Hamilton. Cast scrap is unchanged at $40-$43, shipping point. Consumer demand for steel scrap exceeds domestic supply, forcing mills to import large tonnages. However, comparatively little is coming from the United States.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2325 tons, contract No. 23, New Jersey turnpike bridge, Middlesex county, through Brookfield Construction Co. Inc., New York, to Harris Structural Steel Co., that city.

2050 tons, contract No. 27, New Jersey turnpike, to Bethlehem Steel Co.

2050 tons, contract No. 30, New Jersey turnpike bridge over Raritan river, to Harris Structural Steel Co., New York.

1315 tons, contract No. 28, New Jersey turnpike bridge over Rancocas creek, Burlington county, through Union Building & Construction Corp., Passaic, N. J., to Harris Structural Steel Co., New York.

1300 tons, junior high school No. 125, Bronx, New York, to Schacht Steel Construction Inc., that city.

1130 tons, shipping center, Great Neck, Long Island, to Bethlehem Steel Co.

1060 tons, plant addition, Oak Ridge, Tenn., to Luria Engineering Corp., New York.

670 tons, plant addition, Fairbanks, Morse & Co., Beloit, Wis., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Stone & Webster Engineering Corp., Boston, engineer-contractor; reported June 5 as 400 tons.

620 tons, warehouse, Peter A. Frasse & Co., Lyndhurst, N. J., to Oltmer Iron Works, Jersey City, N. J.

615 tons, school No. 184, Queens, New York, to Schacht Steel Construction Inc., that city.

615 tons, chocolate factory, Fulton, N. Y., to Bethlehem Steel Co.

600 tons, elementary school, District No. 1, Tonawanda, N. Y., to Ernst Iron Works Inc., Buffalo; Siegfried Construction Co. Inc., Buffalo, general contractor.

600 tons, Reading Co. bridge, Reading, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

500 tons, warehouse, Anheuser-Busch Inc., Newark, N. J., to Bethlehem Steel Co.

450 tons, health center, Portland, N. Y., to American Bridge Co., Pittsburgh.

300 tons, state bridge, Mercer county, New Jersey, to Bethlehem Steel Co.

225 tons, housing project 200-3, Boston, to Builders' Iron Works, Somerville, Mass.; C. J. Maney & Co., Somerville, general contractor.

209 tons, plant addition, Pratt & Lambert Inc., Buffalo, to Buffalo Structural Steel Co., Buffalo; John W. Cowper Co. Inc., Buffalo, general contractor.

200 tons, state bridge, Lackawanna county, Pennsylvania, to Pine Brooks Iron Works, Scranton, Pa.

185 tons, building, Pitney-Bowes Co., Stamford, Conn., to Leake & Nelson Co., Bridgeport, Conn.

150 tons, building, Prock Cabinet Co., Glenside, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, warehouse, Seneca Steel Products Co., Buffalo, to Bethlehem Steel Co.; Siegfried Construction Co., Buffalo, general contractor.

100 tons, state highway bridge, Buckland, Mass., to Haarmann Steel Co., Holyoke, Mass.; Warner Bros., Inc., Sunderland, Mass., general contractor.

100 tons, tunnel ribs for University of Washington utility tunnel, Seattle, to Gunderson Bros., Portland; General Construction Co., Seattle, general contractor.

STRUCTURAL STEEL PENDING

3300 tons, contract 34, New Jersey turnpike; Rosenblum Contracting Co., New York, low on general contract.

2500 tons, city prison and remand shelter, Atlantic avenue, Brooklyn, N. Y.; bids July 12.

1600 tons, contract No. 29, New Jersey turnpike bridge work, Mercer and Middlesex counties; Brookfield Construction Co. Inc., New York, low on general contract; also 32,700 ft of bearing piles and 2950 ft of railing.

1000 tons, contract No. 27, New Jersey Turnpike, Gloucester, Camden and Burlington counties; general contract to Savin Construction Corp., East Hartford, Conn.; also required are 12,400 ft of pipe conduit and 5900 ft of bridge railing.

700 tons, hospital, Harrisburg, Pa.; bids June 15.

600 tons, municipal stadium, Scranton, Pa.; Pittsburgh-DesMoines Bridge Co., Pittsburgh, low bidder.

520 tons, state bridge work, route 25, section 1C, Burlington and Mercer counties, New Jersey; bids June 26.

500 tons, 446-ft. four-span I-beam bridge.

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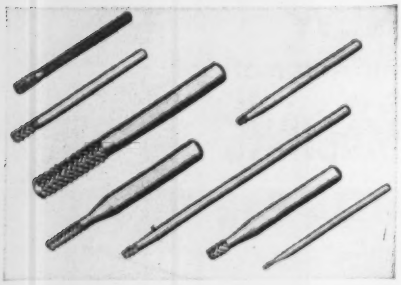

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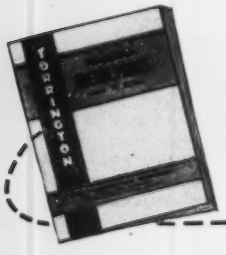

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Townshend, Vt.; bids June 23, Montpelier; 85 tons concrete reinforcing bars.

400 tons, administration building, Philadelphia Electric Co., Philadelphia; bids June 14.

386 tons, state bridge work, Essex and Passaic counties, New Jersey; bids June 26.

350 tons, traffic interchange structure, James J. Storrow Memorial drive, Boston; bids in to Metropolitan District Commission, Boston.

300 tons, contract 25, section 6, New Jersey turnpike, Union county; Poirier & McLane, New York, low on general contract.

300 tons, warehouse and processing building, Airline Foods, Linden, N. J.; bids asked.

287 tons, state bridge work, Allegheny county, Pennsylvania; bids June 30.

250 tons, extra story, telephone building, W. 97th street, New York; bids asked.

250 tons, estimated, telephone building addition, 71st street, Brooklyn, N. Y.; bids asked.

200 tons, 140 ft-2½ in. clear span cantilever and suspended I-beam bridge, Derby, Conn.; bids in.

175 tons, new school, Amherst, N. Y.; Shirley-Herman Co. Inc., Buffalo, general contractor.

155 tons, three state bridges, Mesardis, Whiting and Windham, Me.; bids in, June 7, Augusta, Me.

125 tons, shapes (85) and bars (40), two-span beam bridge, Glastonbury-East Hartford, Conn.; bids in.

120 tons, shapes (75) and bars (45), two-span I-beam bridge, Darien, Conn.; bids in.

100 tons, steel stringer bridge and highway, Buckland, Mass.; Warner Bros., Sunderland, Mass., low on general contract, $160,081.30.

100 tons, 99-ft, one-span wide flanged bridge, Rutland, Vt.; bids June 15, Montpelier.

Unstated, 990-foot steel and concrete Oregon state bridge, Yamhill county; Watts Construction Co., Portland, general contract, $213,775.

Unstated, machine shop, warehouses, heating plant, substation yard, etc., Coulee dam, Wash.; Morrison-Knudsen Co. and Peter Kiewit Sons Co., Seattle, low joint bid $1,487,043.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1800 tons, housing project 200-3, Boston, to Bethlehem Steel Co.; C. J. Maney & Co., Somerville, Mass., general contractor.

1000 tons, housing project, Bridgeport, Conn., to Truscon Steel Co., Long Island City, N. Y.; E. & F. Construction Co., Bridgeport, general contractor; Port Chester Iron Works, Port Chester, N. Y., awarded structural steel.

170 tons, Aqua theater, Seattle, and St. Joseph Hospital addition, Fairbanks, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle.

160 tons, University of Washington journalism building, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Poston Construction Co., Seattle, general contractor.

121 tons, Pennsylvania Turnpike, W. Moreland and Allegheny counties, Pa., to United States Steel Supply Co., Chicago.

100 tons, University of Washington tunnel, Seattle, to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

1005 tons, traffic interchange, James J. Storrow Memorial drive, Boston; bids in to Metropolitan District Commission, Boston.

800 tons, Twentieth Century bridge, Richmond, Ind.; bids asked.

644 tons, Pennsylvania turnpike, Sec. F, Allegheny county, Pennsylvania; bids asked.

440 tons, Akron expressway, SR-5 Sec. 12.31, Summit county, Ohio; bids asked.

363 tons, Pennsylvania turnpike, Sec. E, Allegheny county, Pennsylvania; bids asked.

340 tons, project LR 765 (1-2) and LR 257 (9) for Pennsylvania Department of High-

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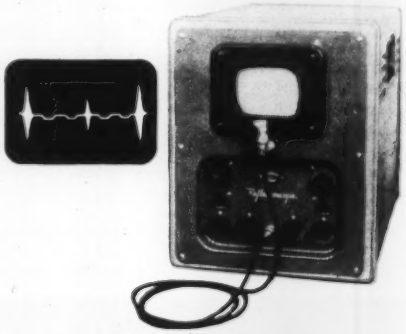

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ways; bids asked.

280 tons, Kaiser-McCool bridge, Mineral county, West Virginia; bids asked.

214 tons, state bridge work, Allegheny county, Pennsylvania; bids June 30.

200 tons, Soda Lake headworks, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., June 19.

200 tons, state hospital, Danville, Pa.; bids asked.

190 tons, reinforced concrete bridge and approaches, Acadia National park, Hancock county, Maine; bids June 30, bureau of public roads, Bar Harbor, Me.

180 tons, elementary school, 2710 S. Dearborn St., Chicago; bids asked.

175 tons, memorial hospital, Elyria, O.; bids asked.

160 tons, Passavant memorial hospital, Jacksonville, Ill.; bids asked.

157 tons, state bridge work, route 25, section 1C, Burlington and Mercer counties, New Jersey; bids June 26.

135 tons, Argonne cancer research hospital to be operated by University of Chicago, Chicago; bids asked.

130 tons, waterworks improvements, Lake Forest, Ill.; bids asked.

108 tons, state bridge work, Trenton, N. J.; bids June 26.

100 tons, state bridge work, route 6, sections 23A and 22B, Essex and Passaic counties, New Jersey; bids June 26.

Unstated, Washington State College dormitory, Pullman, Wash.; Sound Construction Co., Seattle, low $1,352,381.

PLATES . . .

PLATES PENDING

100 tons, steel sheet piling, Soda Lake headworks; bids to Bureau of Reclamation, Ephrata, Wash., June 19.

PIPE . . .

CAST IRON PIPE PENDING

300 tons, 7500 ft 12 in. cast iron pipe, Whidbey Island, Wash., project; bids to U. S. Navy, Seattle, June 15; government furnishes materials.

Unstated, 14,500 ft 6 in., bids invited for alternatives, to U. S. Army Purchasing Officer, Fort Lewis, Wash., June 6.

STEEL PIPE PENDING

Unstated, 2000 ft, 10 gage, 4 in. steel pipe and fittings; bids to L. R. Hills, city clerk, Colville, Wash., June 6.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Baltimore & Ohio, ten 1200-hp switching locomotives, to Fairbanks, Morse & Co., Chicago; equipment is for account of Equitable Life Assurance Society for leasing to the railroad.

Chicago, Rock Island & Pacific, 20 diesel-electric locomotive units, twelve 1500-hp road-switching, one 2250-hp passenger and three 800-hp switching units, going to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; two 1000-hp switching units to the Davenport-Besler Corp., Davenport, Ia.; and two 800-hp switching units to the Lima-Hamilton Corp., Lima, O.

Delaware & Hudson, eighteen 1000-hp switching diesel locomotives and sixteen 1500-hp road switching units, to American Locomotive Co., New York.

Gulf, Mobile & Ohio, 12 diesel-electric locomotive units, four 1600-hp "B" and four 1600-hp road switching units going to the American Locomotive-General Electric Companies, Schenectady, N. Y., and four 1500-hp "B" units, going to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Missouri-Kansas-Texas, eight 1500-hp diesel-electric road switching engines, to Baldwin Locomotive Works, Eddystone, Pa.

Nashville, Chattanooga & St. Louis, 43 diesel-electric locomotives, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; list comprises seventeen 1500-hp road switching and ten 1200-hp switching units and sixteen 1500-hp road engines.

Texas & Pacific, 23 diesel-electric locomotives, comprising nineteen 1500-hp freight and four 1200-hp switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Western Pacific, one rail diesel car, to Budd Co., Philadelphia.

FERROALLOYS

(Continued from Page 133)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50%

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Boxes, Carburizing ☐	Pipe,	Tubes, Combustion ☐
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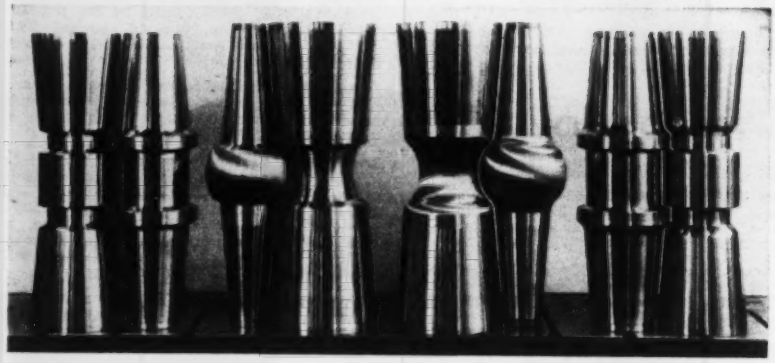

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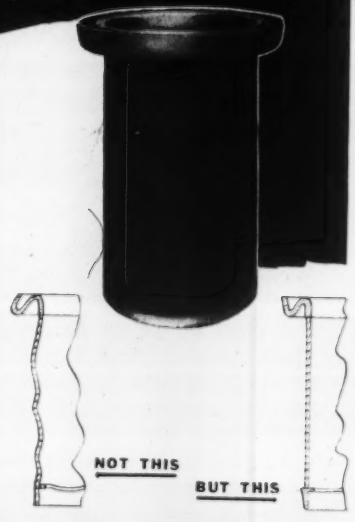

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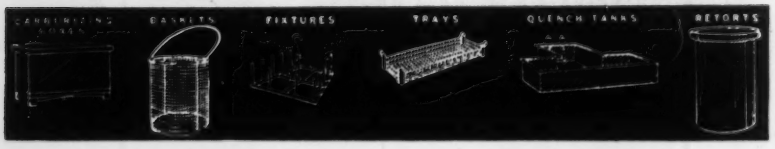

C grade, $1.03 per lb of contained chromium; ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅛ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3⅛ lb and containing exactly 2 lb of Mn and approx. ⅛ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

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Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered, Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c. f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum. 95.00c.

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

University of Alabama's **University Center,** University, Ala., offers graduate level work in two courses in the field of structural engineering as the result of numerous requests of graduate engineers in the Birmingham district. Courses to be offered, starting in June, include an advanced structural design course, and an intermediate theory of structures course.

Alabama

Birmingham's Committee of 100, established Jan. 1 in recognition of the need for centralized and co-ordinated effort to increase the district's industrial endeavor, brought ten new industries with a total of 1095 new jobs into the district. It has a file of 163 active prospects and will probably make two or more additional announcements soon.

California

"Steel Arteries for the West," a 16-mm industrial motion picture, produced in full color and sound, was released by **Kaiser Steel Corp.,** Oakland, Calif. It tells the story of the manufacture of continuous weld pipe in sizes ranging from ½-in. to 4 in. at the only pipe mill of its kind west of the Mississippi. Arrangements for showings may be made through the public relations office, Kaiser Steel Corp., Fontana, Calif.

California

Schlage Lock Co., San Francisco, building hardware manufacturer, started work on a 100,000 sq ft assembly, shipping and storage building. Total cost of the expansion is estimated at $500,000.

California

Englander Co. Inc., Chicago, manufacturer of mattresses and bed springs, started construction of a new 60,000 sq ft plant in Oakland, Calif.

California

Pacific Coast plant of **Parker Rust Proof Co.,** Detroit, manufacturer of metal preparation and cleaning products, is in operation at 3710 Fruitland Ave., Maywood, Calif. Manager of the Maywood plant is S. N. Headlee.

Connecticut

Hartford Special Machinery Co., Hartford, Conn., appointed these representatives: Dayton & Bakewell, Los Angeles, to handle swagers, die polishers and super-spacers; Hoffman & Heartt, Los Angeles, to handle automatic drilling and tapping machines and the Hartford thread roller; Thomas Wallace, Los Angeles and San Francisco, to handle the Hartford superspacer and sensitive drilling machines; William Scheer Co., St. Louis, to handle automatic drilling and tapping machines, thread roller, die polishers and sensitive drilling machines.

Delaware

International Steel Distributors Inc., steel, was chartered by the corporation department of the secretary of state's office at Dover, Del. Capital of the firm is listed at 10,000 shares of no par stock.

Delaware

Ozark-Mahoning Mining Co., Tulsa, Okla., began operations in the firm's new plant at the Wilmington Marine Terminal property, Wilmington, Del. The plant will be used to store the fluorspar that arrives at the terminal from Spain, dry it out by subjecting it to intense heat, and then ship it to chemical plants on the East Coast for the manufacture of hydrofluoric acid and fluorine products.

Delaware

International Metallurgical Chrome Corp., metals, was chartered by the corporation department of the secretary of state's office at Dover, Del. Capital of the firm is listed at $3.5 million. Registrar & Transfer Co., Dover, Del., is serving as the principal office.

Illinois

Dean Milk Co., Chicago, awarded the general contract for a warehouse and office building in Franklin Park, Ill., to Ragnar Benson Inc., Chicago. Victor L. Charn, that city, is the architect.

Illinois

Mall Tool Co., Crete, Ill., awarded the general contract for an addition to its plant to Gaskill & Walton, that city. Estimated cost is $200,000.

Illinois

General Foods Corp., New York, awarded the general contract for construction of a warehouse building, in Kankakee, Ill., to Kaiser-Ducett Co., Chicago. The building will cost about $900,000.

Illinois

Chicago office of **Holcroft & Co.,** Detroit—heat treating furnaces—is moved to 4209 S. Western Blvd. C. H. Martin, vice president, is in charge of the Chicago office; contact work will be handled by A. A. Engelhardt. Fabrication and installation will be under the direction of George Stark, erection superintendent and service engineer.

Illinois

Crescent Industries Inc., Chicago, awarded the general contract for design and construction of a factory building in Niles, Ill., to Kiefstad Engineering Co., Chicago. Cost will be about $725,000.

Illinois

G. D. Searle & Co., Skokie, Ill., awarded the general contract for construction of a pharmaceutical plant and laboratory building to the George A. Fuller Co., Chicago. The project will cost about $750,000. Herbert G. Banse, Chicago, is the architect.

Kansas

Joe Daylor Motor Co., Wamego, Kans., will award contracts soon for construction of an automobile service, garage and sales building to cost about $80,000. W. O. Wolfenbarger & Associates, Manhattan, Kans., is the architect.

Massachusetts

Ward Steel Co., 44 Farnsworth St., Boston 10, started construction of a warehouse for occupancy about October, at 87 Rindge Ave. Extension, Cambridge, Mass.

Michigan

Butterfield Division, **Union Twist Drill Co.,** Derby Line, Vt., appointed Gar-

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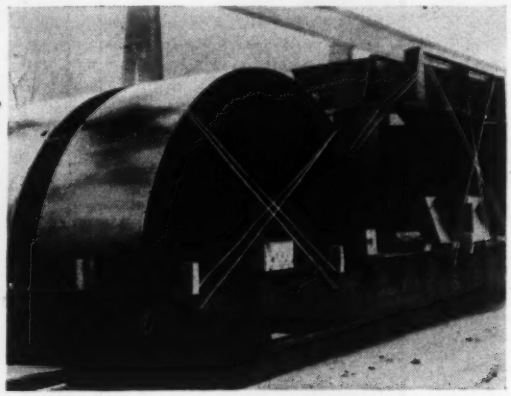

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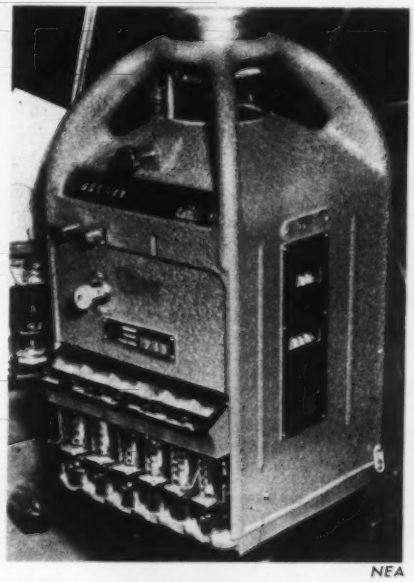
HOTEL CLEVELAND
Cleveland, Ohio

ner-Shelton Co., Detroit, a distributor of the company's taps, dies, reamers and special metal-cutting tools.

Michigan

Pennsylvania Salt Mfg. Co., Philadelphia, opened at 535 Griswold St., Detroit, a district sales office to serve industrial customers in that city and southern Michigan. Harry G. Potts, district sales manager of the company's heavy chemicals department, will be in charge. W. B. Adam, heavy chemicals sales representative, and Willis J. Stoddard of the special chemicals department, also will make their headquarters in the new office.



NEA

BUT NO 'THANK YOU': This fare box made by Ohmer Corp., Dayton, O., subsidiary of Rockwell Mfg. Co., Pittsburgh, does everything but thank the customers or lead them to their seats. Riders feed coins into the "mouth" at the top; the correct change comes out at the bottom. The robot fare box disdains slugs and buttons

Missouri

Flex-O-Lite Mfg. Corp., St. Louis, entered into a contract with Brown & Ideson Inc., that city, for the construction of a factory building to be erected on Gardenville at the St. Louis-San Francisco railroad tracks in Affton, Mo.

Oregon

Fire in plants of **Portland Chain Mfg. Co.** and **Skookum Logging Equipment Co.,** Portland, Oreg., May 29, caused $250,000 estimated loss.

New Jersey

Metals Disintegrating Co. Inc., Elizabeth, N. Y.—metal powders, metal pigments and metal abrasives—appointed **Western Chemicals Inc.,** Seattle and Portland, Oreg., as northwest distributor of its aluminum paste, aluminum powders and gold bronze powders.

New Jersey

Frigilatem Welding Alloys Inc. was organized to develop and merchandise new low-temperature welding rods and fluxes, both gas and arc, for all

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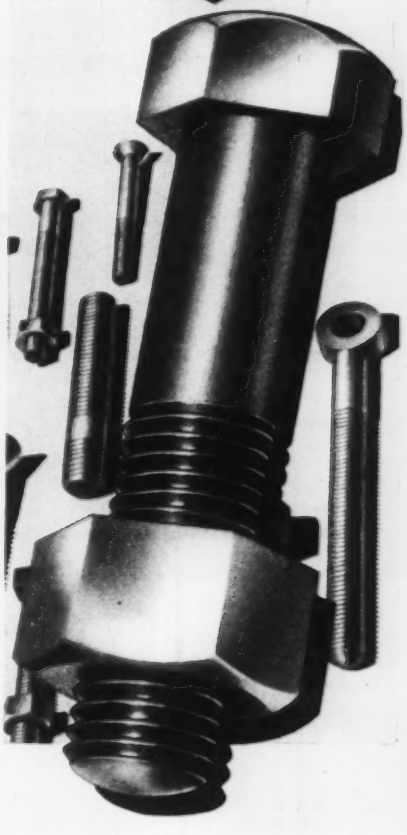

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